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ORIGINAL ARTICLES

A CONSIDERATION OF THE PRESSURE PRODUCED BY THE MANDIBULAR THIRD MOLAR*

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"ATROPHY of bone may arise as a senile or marantic change, from pressure, disuse, or from neurotrophic disorders. * * * Atrophy from pressure is of course local. A familiar instance is the depression of the bones of the calvarium due to the Pacchionian bodies. Hydrocephalus and intracranial growths lead to atrophy of the calvarium."[1]

"Another example commonly adduced is the effect of aneurysms upon the tissues upon which they impinge. Soft tissues yield in front of them—hard tissues, like bone, are hollowed out before them. But I cannot believe that this is merely a pressure atrophy, for one finds the bone actually comminuted, as though with a hammer, and the fragments bathed in blood and attacked by great phagocytic giant-cells (osteoclasts)."[2]

"In atrophy the osteoclasts are greatly increased in number and lie closely packed together."[3]

In the region of the oral cavity the two chief sources of pressure atrophy are cysts and developing teeth. The epithelial lining of the cyst wall develops, on account of its secretory activity, a gentle pressure which gradually hollows out large areas of the less resistant cancellous tissue. The normal eruption of a tooth through the alveolar border may well be considered as an example of pressure atrophy. The absorption of the distal root of the mandibular second molar associated with the near presence of a deeply submerged horizontally placed third molar and the absorption of the lingual root of a first premolar associated with the near presence of a horizontally placed canine are comparatively frequent examples of dental pressure atrophy.

*Read before the New York Society of Orthodontists, New York City, March 10, 1926.

It is not the purpose of this paper to add to the already too lengthy list of theories concerning the eruption of teeth. The process resembles very closely the phenomenon of so-called pressure atrophy. The most characteristic fact associated with the passage of the teeth through the bone is that a "zone of rarefaction exists over the teeth in the stages of eruption." At no time does the enamel cap come in direct contact with the bone. The tissue elements in and beyond the zone of rarefaction acting the same as the osteoclastic process beyond the walls of the aneurysms hollow out the bone in advance of the erupting tooth. At no time is there any contact or impingement or trauma produced by the advancing tooth directly against the bone. The "consciousness of growth" has associated with it catabolic as well as anabolic elements. The two processes are so nicely balanced that no measuring device is sufficiently delicate to measure the difference in the factors involved.

Dental literature abounds with references to the terrific pressure pro-

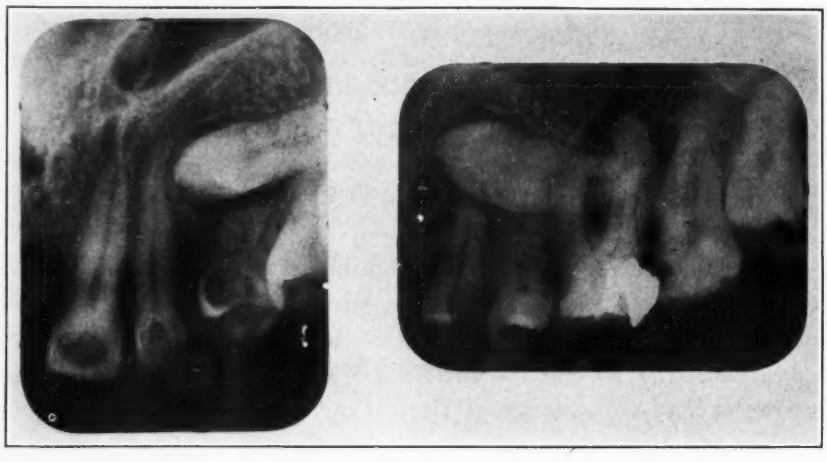

Fig. 1.—The unerupted canine has produced complete resorption of the apical third of the first premolar and partial resorption of the second premolar. Both premolars were vital. Note complete absence of pressure as is evidenced by the normal axial relationship and spacing of the teeth.

duced by erupting or so-called "impacted" teeth, particularly the mandibular third molars. This misconception has been graphically described as follows: "If these cases are radiographed they reveal to us the impacted third molar with its feet against solid rock, so to speak, exerting more force in endeavoring to erupt than our beautifully occluding teeth can overcome." Evidently this author has never taken the trouble to study this solid rock. A cursory examination of the environment of the erupting mandibular third molar completely refutes his flights of oratory. Any opinion based upon this misconception has just as much value as the misconception itself. In the study of cross sections it will be seen that the mandibular third molar is suspended in cancellous tissue of the wide-meshed variety and that it has less compact bone in its immediate vicinity than any other tooth in the mandible.

The term "impacted" is not truly descriptive of the anatomic mechanisms involved in the development of the deeply imbedded horizontal mandibular third molar. Impacted, as defined by Funk and Wagnalls, refers to the

act of striking, collision. In popular parlance it refers to the forcible contact of a moving body with one at rest. It has already been shown that pressure in other parts of the osseous system is associated with absorption. Since the jaw bones including the alveolar process have all the structural and functional characteristics of true bone, pressure in this region must also be associated with absorption. The fact that the distal root of the mandibular molar may be partly or wholly absorbed when the crown of the third molar is directed toward it, is in conformance with this law. On account of the area of rarefaction between the crown of the third molar and the distal root of the second molar undergoing absorption, there is no contact, hence no act of striking or collision upon the distal root. The third molar pushes forward the second

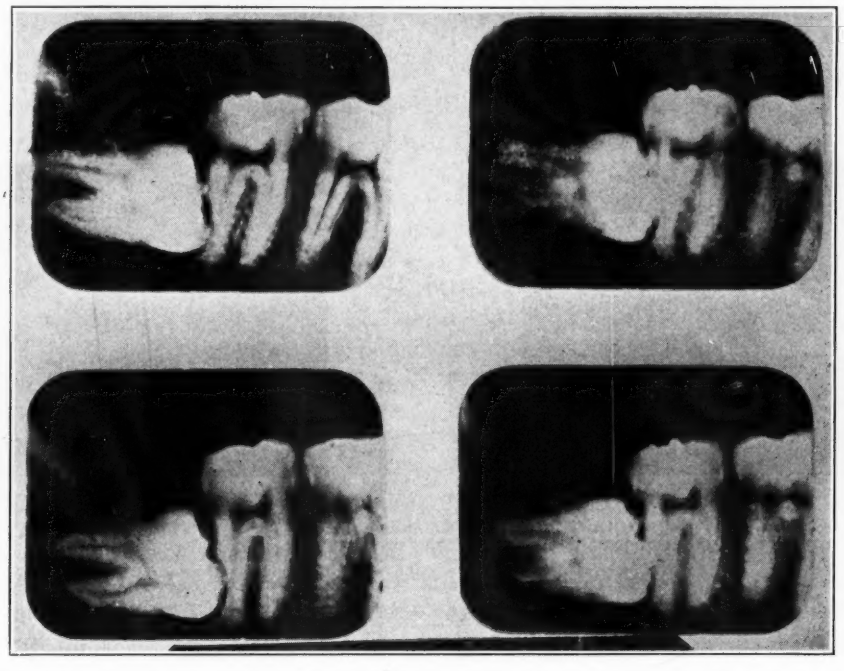

Fig. 2.—Comparison of the different films shows that there is no contact at any point between the crown of the submerged mandibular third molar with the roots of the second molar. Note the wide open contact point between the crowns of the first and second molars. The absence of supporting trabeculae has caused a distal inclination of the second molar. Instead of movement anteriorly there seems to be a drifting distally. Question: How can this condition cause overlapping of the central incisors? (Case from collection of Dr. George B. Winter.)

molar no more than the advancing aneurysm pushes forward the sternum. The process in front of the advancing tooth is one of erosion which continues until the dental organ has fulfilled its cycle of growth.

It is interesting to observe clinically what may happen in the apical region of a deeply embedded mandibular third molar where the developing follicle is almost in direct contact with the mandibular nerve. In its further development this jelly-like tissue is directed above, below, to one side, to both sides, or at times, may completely surround this large nerve trunk. In the bone beyond the apical end the osteoclastic activity seems to be as much in evidence as in the bone ahead of the crown when for any reason the advance is slowed up before the predetermined size of the tooth is consummated.

Pressure seems to be incompatible with physiologic laws. Undue pressure causes death. Gentle pressure constantly applied causes absorption. On the other hand it must be borne in mind that absorption may occur without pressure, as in the case of absorption of the roots of a deciduous tooth when the corresponding permanent tooth is congenitally absent.

The misinterpretation of the dental radiogram has been the most important factor contributing to the pressure theory of erupting third molars. The fact that the developing crown of the mandibular third molar is normally directed slightly forward is often not taken into consideration. Roentgen rays carefully directed parallel to the interproximal and occlusal planes invariably reveal not only a space between the second and third molars but also normal bone exhibiting no sign of pressure atrophy.

How sufficient pressure can be applied to the entire denture to wreck the occlusion when the third and second molars are not in contact has not been explained. The reason why normally occluded dentures which have never

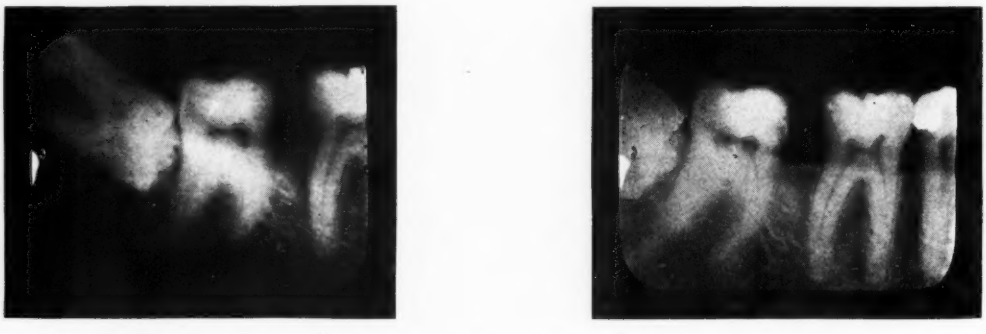

Fig. 3.—Note the space of 3 mm. between the first and second molars, the lack of contact between the horizontally submerged third molar and the second molar, and the absence of pressure phenomena in the bone and in the occlusion.

been regulated are not disrupted has never been explained. Why Class II cases where the mandibular arch is distal to normal in its relation to the maxillary arch, have not been corrected by the alleged pressure of "impacted" third molars has not been explained. All the hue and cry demanding the extraction of third molars to prevent the return of the teeth to their former positions when the retaining appliances have been removed is raised as an alibi by the orthodontist who has failed to secure the physiologically correct occlusion which is normal for that individual. The indiscriminate extraction of third molars developing in normal position deserves only the severest condemnation.

Notwithstanding the brilliant researches in bone development, bone regeneration, endocrinology, calcium metabolism, ultra violet therapy, diet, exercise, vitamines, and other contributing factors, the "consciousness of growth" has not been wholly defined. Why complicate the constructive effort which is patiently striving for this solution by introducing pet theories or personal prejudices which are invariably founded upon false premises? If by some magic wand, coincidence could be eliminated from clinical observation what advances could be made in orthodontic science. In this paper the phe-

nomenon of pressure atrophy has been resurrected. It must be separated from coincidence and be reckoned with in development.

REFERENCES

[1]Adami and Nicholls: Principles of Pathology, Philadelphia and New York, 1911, Lea and Febiger, ii, 1082.
[2]MacCallum: A Text Book of Pathology, Philadelphia and London, 1916, W. B. Saunders Co., p. 65.
[3]Adami and Nicholls: Idem.

DISCUSSION

Dr. Harry E. Kelsey, Baltimore.—I am in perfect agreement with Dr. MacMillan that the theory so long held, that erupting teeth exert vast pressure upon the tissues around them, is entirely false and at variance with physiologic processes throughout the body. He has pointed out something that every one who has examined radiograms, if correctly made, must have seen but failed to note its significance.

I refer to the fact that there is invariably space between the erupting tooth and the tooth or other structures against which it is impinging. I have not made dissections of these conditions, but my impression is, that in those cases in which the eruptive processes of the teeth are absolutely quiescent, the crown of the tooth may be in actual contact with the bone around it, or the tooth adjacent to it, but let the eruptive forces whatever they are, become active and begin to project the tooth toward the point that it should emerge and there will be immediate cell activity in advance of the tooth, which will necessarily create a space between the tooth and the bone which surrounds it, but if any pressure is exerted during the process it is extremely slight, because we know that we can overcome it with the force exerted by a delicate 0.020 gauge spring wire.

Even that slight pressure applied continuously will induce the tooth to move in the desired direction. I say it will induce the tooth to move advisedly because I think there is a great misstatement of fact, when we say as we constantly do, that such an appliance moves the teeth. Doubtless many people still think so, but I believe most orthodontists realize that their delicate appliances merely stimulate movement. They bring about changes in the position of the teeth, but not directly through the amount of pressure they exert, if they did we could put them on the teeth of a cadaver and produce movement. I have seen that tried and it was of course a notable failure.

While as before stated, I agree with Dr. MacMillan as to the eruption of teeth and the behavior of the third molars within the jaw and believe with him that there is no great pressure exerted, yet, I do believe that nature's processes for providing space for an incoming tooth, may involve complete movement of all the teeth in the arch, that while the tooth itself does not by any great pressure exerted cause this movement, yet it takes place providing the tooth, say for instance a third molar, has not space to erupt.

It was so in my own mouth. I know of another dentist in whose mouth the same thing occurred and I have seen it occur with greater frequency than I could desire, in cases which have had orthodontic treatment. Undoubtedly many third molars are unnecessarily extracted. It can become a hobby, or a makeshift treatment.

I am glad Dr. MacMillan has called attention to this, but the great message he brings in this paper and others he has written, is that physiologic processes connected with the eruption of the teeth and the building of the alveolar process are identical with those relating to other structures of the body.

But, there is one factor in relation to the teeth, not possessed by any other structure which more than any other thing disturbs our calculations regarding the relation existing between the size and shape of the teeth and the surrounding structures; which is, that after the enamel matrix is once laid down, the size of the teeth cannot be altered to accommodate them to adjacent structures. The body and all its parts save the teeth, on the other hand, are subject to influences of heredity and environment from conception to full maturity; the teeth only until the size of the crown is determined. Thereafter all the accommodation must be done by the surrounding structures. The jaws of civilized man do not always attain ideal development, even with the utmost artificial stimulation we can give.

This being the case, our measure of success in treatment must teach us, if we have been conscientious, when to sacrifice the third molars.

It is my belief, that in most cases we can with the aid of the x-ray in conjunction with our clinical observation, determine before full maturity is reached whether the third molars can be retained and become practical functioning members of the dental arches. If they cannot, it is better from the standpoint of the orthodontist to remove them as early as possible for several reasons, primarily of course, to avoid disturbing occlusal improvement which our treatment has brought about; secondly, to avoid a tendency toward food packing between the first and second molars, which occurs in some cases in which the third molars are removed after full maturity, and in the third place, to avoid an infection, occurring especially around the lower ones, which besides often causing a great deal of suffering, makes it more difficult in some instances to make a clean operation.

While I am on record as believing that both the maxilla and mandible are capable of supplemental development as a result of orthodontic stimulation, I have always taken the ground that the amount of development varies from comparatively little to as much as is required for the full complement of teeth. If this is true, there will be some cases which through lack of function, lack of ability to respond to orthodontic treatment and through some of the little known factors influencing development, in which we can never supply room enough in the jaw for the full complement of the teeth and I believe that other things being equal, it is better the wisdom teeth be extracted, than any teeth anterior to them.

We shall learn more of this by the study of long series of extraoral x-ray plates of the third molar area, such as Dr. Young has been making for a period of a good many years. His opinion should be worth much on this subject. I would also like to hear from Dr. Hawley, as I know he has been using and studying Simon's diagnostic methods and I hope this or some other definite means will enable us sooner or later to determine when the maxillary dental arch is located normally in the head.

Dr. Fred R. Blumenthal, Boston.—It has been a great pleasure to listen to Dr. MacMillan's most interesting and instructive paper and it is indeed a privilege to be permitted to discuss it. Dr. MacMillan has so thoroughly covered his subject and Dr. Kelsey has so adequately discussed it that there is really very little for me to say. As the hour is now very late I shall reduce my discussion to a few slides* and shall show you the practical application of some of his findings in cases in my office and upon animals in the research laboratories of the Harvard Dental School under the direction of Dr. Lawrence W. Baker, to whom I am deeply indebted for encouragement and aid in this work.

Dr. MacMillan first points out that the two chief sources of pressure atrophy usually associated with the oral cavity are cysts and erupting teeth. In the first slide you see an extensive cyst of the superior maxilla. Note the positions of the permanent central and lateral incisors. The extent of the absorbed area, confirms Dr. MacMillan's view that it was caused by the gentle and constant pressure of the secretory fluid within the sac and not by the direct contact and pressure of the teeth against the bone.

Secondly the question of erupting teeth is most important. Here (slide) we have a malposed unerupted canine tooth of a patient thirteen years of age. Note the lateral incisor root is almost completely absorbed due unquestionably to the constant pressure of the membranous sac enclosing the point of the erupting canine. Until today, I had been of the opinion that this extensive absorption had been caused by the direct pressure of canine crown against the root of the lateral incisor, but Dr. MacMillan has now shown us from his beautiful histologic specimens that his viewpoint is more reasonable.

Dr. MacMillan has hit upon a most important point when he says that many radiograms are misinterpreted. I agree with him absolutely. I believe too that many men fail to recognize normal conditions at the various developmental periods. The technic of taking radiograms is of the utmost importance. Poorly taken and diagnosed without consideration of all possible factors, they often lead to many errors in orthodontic treatment.

Thanks to Dr. J. Lowe Young who started me about 8 years ago, in this field of radiographing all my cases, my routine now consists of radiographing every child when beginning

*Lantern slides were shown.

the case. Two lateral plates and from two to four intraoral films are taken. By taking these annually of the same child, I have an absolute knowledge of the development of all the teeth of my patient. If started at the age of five or six years the developing permanent teeth can be observed, and by comparing the radiograms of each year I can see the root formation, the appearance of the wisdom tooth buds, etc. The enamel cusps of the wisdom teeth, from my observation, normally appear at about the age of seven and one-half years. If the development of these crowns is carefully watched, you will see from my slides that they do not form with their occlusal surface absolutely upright, but that in their process of development gradually right themselves.

In the next series of slides of children between the ages of seven and ten, you will note the relation of the occlusal surface of the permanent molar teeth to the inclination of the alveolar border. Note also the position that these teeth occupy in the mandible.

I wonder if anything has ever been said as to the relation of this normal curve of the occlusal surfaces of these developing molars, to the curve of the border of the mandible. I believe this worthy of further consideration.

A careful study of our cases by radiograms during progress might eliminate many of our difficulties. For, from my slides, you can readily see how easy it would be to move, crowd, or tip, a delicate developing bud by exerting too much pressure.

I know, from sad experience, of a case which was under my care about ten years ago, when I tipped the first molar slightly distal by exerting too much pressure with my appliance. The radiogram showed me that not only did I tip the first molar, but I crowded the developing second molar bud into an impacted position and even caused disturbance in the wisdom tooth region.

Coming down to the final question—the question somewhat similar to the one that Dr. Young sent us several months ago, as to whether we believe the erupting wisdom teeth cause pressure and in turn cause irregularity of the already erupted teeth, I do not recall exactly how I replied to this questionnaire but believe it was to the effect that in many of my patients under observation at the age of seventeen to twenty, when the wisdom teeth are crowded and about to erupt, I have noticed a crowding of the mandibular anterior teeth, but I have absolutely no proof that it was definitely the wisdom teeth that were causing this.

The next two slides were carefully selected and loaned to me from the Peabody Museum by Dr. E. A. Hooton, Professor of Anthropology of Harvard University. Dr. Hooton is deeply interested in the work of the orthodontist and is ever ready to assist any of us here in any of our research problems.

In this slide of a gorilla you will notice that even animals have malocclusion for here we have a malposed impacted fourth molar, and yet in this gorilla's arch there is no disturbance of any other teeth. This again is no proof that it could not have caused a disturbance.

In the next slide we have two mandibles, one of an old Hawaiian and one of an old American Indian. In the Hawaiian mandible you see an impacted wisdom tooth and a typical crowding of the mandibular anterior teeth. In the Indian mandible you see two badly impacted wisdom teeth with a perfectly beautiful and normal arch. So, I am still on the fence.

I believe this is all I can add. I cannot give a definite decision at this time. To deal directly with the subject of the paper, I am convinced from Dr. MacMillan's splendid presentation that there is less pressure in many of the cases than we have heretofore thought.

Again I express my sincerest thanks to Dr. MacMillan and the Society.

Dr. MacMillan.—From clinical observation it is seen that bone regeneration or rebuilding occurs much more readily in the years previous to the complete ossification of the bone. Most of the experimental work concerning bone growth has been done on young animals. A partial answer to Dr. Kelsey's question might be made by repeating these experiments on older animals. From a clinical standpoint no one has shown better than Dr. Kelsey himself the possibilities of supplemental growth of the mandible in young adults.

The clinical case exhibited by the Department of Orthodontia, Columbia University, in which the anterior maxillary teeth were in lingual occlusion offers several opportunities for argument. In addition to bringing the anterior maxillary teeth labial to the mandibular teeth, the mandibular teeth should also be tipped anteriorly. This case illustrates beautifully the importance of determining the degree of the axial angle which may be considered as indi-

vidually normal. If this patient should remain with the mandibular incisors in the position they now occupy, thereby decreasing the circumference of the mandibular arch the mandibular third molars would very likely remain submerged, due to their position far back in the ramus. By tipping forward the mandibular incisors, increasing the circumference of the arch, stimulating the normal development of the mandible, there will be provided sufficient space for the eruption of the mandibular third molars. Instead of focusing entire attention upon the mandibular first molar as the key to occlusion or some other arbitrary measurement which necessarily must be altered to suit the individual requirements of each patient the development of the jaws as a whole might better be considered. If this is done several cases of underdevelopment of the mandible associated with disuse atrophy will be seen, the correction of which will render unnecessary a "key to occlusion."

In regard to the pressure on soft tissue, the classical example of the bed sore is called to mind. The complete absence of nourishment soon produces a local gangrene. This is a true "trauma" in no wise related to so-called traumatic occlusion.

The discussion of Dr. Blumenthal deserves the highest commendation. If he will continue his beautiful radiographic records and draw accurate conclusions therefrom, he will add more to the science of orthodontia than he will by his animal experimentation, however valuable that may be. The most valuable scientific contributions have been made by philosophers as well as by laboratory workers.

An interesting case of a patient, age 30, illustrating the lack of contact between a submerged maxillary third molar and the second molar was recently shown me by Dr. J. P. Becker. The close proximity of the third molar to the roots of the second molar had produced a ragged area of resorption of the distal surfaces of the distobuccal and palatal roots of the second molar which area had invaded the root canals. The pulp in the second molar had remained vital. After extraction of the two teeth it was impossible to place them in their former relative positions with any degree of accuracy, due to the extensive resorption. The resorption of the second molar was analagous to the resorption of the roots of the deciduous teeth associated with the near presence of the erupting premolar.

The "zone of rarefaction" or the space created by the absorption process is nature's protective measure against pressure. This zone contains tissue which is abundantly supplied with blood nourishing the osteoclastic process. At no time is there sufficient pressure on the tissue in this zone of rarefaction to interfere with the circulation. If there were, there would be produced a localized gangrene.

LOCATION OF THE DENTAL FORAMINA IN HUMAN SKULLS FROM STATISTICAL OBSERVATIONS

By Yoshimi Matsuda, D.D.S., Boston, Mass.

SO FAR as I am aware no dental practitioners have determined by statistical methods, the exact location of the dental foramina in the human subject.

Knowledge of the exact location of this foramina is important when conduction anesthesia is to be employed in the extraction of teeth. Owing to the importance of this information I have attempted to determine the location of this foramen by examination of a large series of human crania from the Wistar Institute of Anatomy in Philadelphia, and the American Museum of Natural History in New York.

In each specimen examined the complete dental alveolar ridge was in excellent condition.

Skulls of the following races were examined:

1. American Indian (Haida, Tsumshian, Kwakiutl, Bella Colla, Salish, Nootka, Chinook, Yakima, Thompson, Shushwap and Kiowa, etc.).
2. African (Eastern, Western and Southern parts).
3. Mexican.
4. German.
5. Egyptian.
6. Australian.
7. Tasmanian.
8. New Zealander (Maori).
9. Eskimos.
10. Japanese (few).
11. Italian (few).
12. Peruvian (including with Bolivian type).
13. Bolivian.

Of the skulls examined 380 had complete maxillae and 329 were accompanied by the mandibles.

In this investigation I have determined the location of the mental foramen, the mandibular foramen, the infraorbital foramen and the posterior palatine foramen.

LOCATION OF THE MENTAL FORAMEN

I have found as a result in examining 329 mandibles that the mental foramen was located as follows:

In 57 cases, on the right side, the upper border of the mental foramen was 13.5 to 14.0 mm. below the upper margin of the alveolar process, and in

54 cases, on the left side, the upper border of the mental foramen was 14.5 to 15.0 mm. below the upper margin of the alveolar process.

These 57 cases of right mental foramina represent 17.33 per cent of the total number of skulls examined. The 54 cases of left mental foramina represent 16.41 per cent of the cases examined.

The lower borders of the mental foramina were 13.5 to 14.0 mm. above the base of the mandible in 63 specimens measured on the right side and 14.5 to 15.0 mm. in 81 cases measured on the same side.

TABLE I

LOCATION OF THE MENTAL FORAMINA

Below	CASE		PERCENTAGE	
	Right	Left	Right	Left
1 pm.	18	3	5.47	0.91
1 △ 2 pm.	68	37	20.67	11.25
2 pm.	221	230	67.17	69.91
1 m. △ 2 pm.	15	25	4.56	7.60
1 m. m. b. r.	5	22	1.52	6.69
1 m. between m. b. r. and d. b. r.	2	12	0.61	3.65

NOTE: 1 pm.—first premolar.
1 △ 2 pm.—below the space between first and second premolar.
2 pm.—below the space between first molar and second premolar.
m. b. r.—mesiobuccal root.
bet., m. b. r. and d. b. r.—space between mesiobuccal root and distobuccal root.

The former number represents 19.15 per cent of the total number of skulls examined, while the latter number represents 24.02 per cent of the total number of skulls examined.

In my observations I note that the limits of variation are rarely from 2.5 to 8.0 mm. for the shortest distance between the alveolar process and the upper border of the mental foramen, and from 20.5 to 23.0 mm. for the greatest distance between these two points.

Simultaneously I have observed that the minimum distance from the base of the mandible to the lower border of the mental foramen was, in rare cases. 8.5 to 9.0 mm., while occasionally this distance measured as much as 18.5 to 20.0 mm.

I have never observed a case in which this distance was less than 2.5 mm. or more than 23.0 mm.

Of 329 cases examined 221 or 67.17 per cent on the right side and 230 or 69.91 per cent on the left side showed the mental foramen located below the second premolar, while 68 or 20.67 per cent on the right side and 37 or 11.25 per cent on the left side showed the mental foramen located below the space between the first and second premolar.

In a total number of 658 cases, including both right and left sides, 451 or 68.54 per cent showed the mental foramen, in each case, situated below the lower second premolar.

In 105 cases or 15.96 per cent of the total (658) the mental foramen, in each case, was opposite the space between the first and second premolar.

It should not be assumed that the mental foramina of the two sides occupy the same position in relation to other parts.

My observations show that the mental foramina in 45 cases, or 13.68 per cent of the total 329 cases, are symmetrically located as regards the distance from the alveolar process to the upper border of the foramen, and 58 cases or 17.63 per cent are symmetrically located as regards the distance from the mandibular base to the lower border of the foramen.

In this work I have classified the location of the mental foramina of human skulls as follows:

Class I. Below the lower first premolar.
Class II. Below the space between lower first and second premolar.
Class III. Below the lower second premolar.
Class IV. Below the space between lower first molar and second premolar.
Class V. Below the mesiobuccal root of the lower first molar.
Class VI. Below the space between the mesiobuccal and distobuccal roots of the lower first molar.

Mental foramina of human skulls can be included in these classes. Table I presents in diagrammatic form the percentage location of the mental foramina as determined by these observations.

LOCATION OF THE MANDIBULAR FORAMEN

I have determined the distance from the alveolar ridge at a point between the two lower median incisors to the anterior ridge of the mandibular foramen. On the right side 237 cases, or 72.04 per cent of the total number of 329 cases, the distance measured 76.0 to 84.5 mm.

On the left side 231 cases, or 70.21 per cent of the same number, the distance measured 76.0 to 84.5 mm.

Although the sides are not symmetrical from the statistical observations, yet it may be assumed that the mandibular foramen on both sides is commonly located 76.0 to 86.5 mm. below the alveolar ridge at a point between the two first incisors.

On the left side 279 cases or 84.80 per cent of a total number of 329 are situated 76.0 to 86.5 mm. below the alveolar border.

While the mandibular foramen may not be found always in this location it may be said that this is its usual position. Only in a small number of cases are the mandibular foramina of the two sides symmetrically located in the position above mentioned.

I have also measured the distance from a point on the crest of the internal oblique line, directly opposite the lower third molar, to the superior spine-like border of the mandibular foramen.

This method of measuring was adopted in order to get accurate results, since all practitioners recognize this point (which is practically covered with mucous membrane) as a landmark in conduction anesthesia.

By this method I have obtained the following results:

On the right side 73 cases, or 22.19 per cent, measured from 11.0 to 11.5 mm., 72 cases, or 21.88 per cent, measured from 10.0 to 10.5 mm., 59 cases, or 17.93 per cent, measured from 9.0 to 9.5 mm.

On the left side 76 cases or 23.10 per cent measured from 10.0 to 10.5 mm.; 67 cases or 20.36 per cent measured from 11.0 to 11.5 mm.; 59 cases or 17.93 per cent measured from 9.0 to 9.5 mm.

My results show that the location of the mandibular foramen is commonly 7.0 to 13.5 mm. posterior from the crest of the internal oblique line, and also that this foramen is located from 76.0 to 86.5 mm. from a point on the alveolar border between the two lateral incisors.

We must bear in mind, however, that there are rare cases which vary from these measurements.

I wish to say that I have never seen a case in which the mandibular foramen was less than 70.0 mm. or more than 94.0 mm. from the alveolar border between the median incisor teeth, or less than 5.5 mm. or more than 18.50 mm. from a point on the crest of the internal oblique line directly opposite the third molar to the superior border of the mandibular foramen.

In 97 cases, or 29.48 per cent of the total number measured, the location of the mandibular foramen was symmetrical on the two sides as measured from a point on the alveolar ridge between the median incisors; in 116 cases, or 35.26 per cent, the distance from the oblique line to the anterior border of the mandibular foramen was alike on the two sides.

LOCATION OF THE INFRAORBITAL FORAMEN

In determining the location of the infraorbital foramen I have measured the distance from the lower border of the alveolar process to the lower border of the infraorbital foramen. This measurement is taken on a line at right angles to the line of the alveolar process.

I have also measured the distance between the upper border of the infraorbital foramen and the lower margin of the orbital rim. The shortest distance between the upper border of the foramen and the lower border of the orbit is always taken in this measurement.

In this investigation 380 superior maxillary bones were measured.

In 90 specimens of the right superior maxillary bones the distance from the upper border of the infraorbital foramen and the inferior border of the orbit measured from 6.5 to 7.0 mm. This measurement occurred in 23.68 per cent of the total number of specimens measured.

In 83 specimens, or 21.84 per cent, this measurement was from 7.5 to 8.0 mm.; in 79 specimens, or 20.79 per cent, this measurement was from 5.5 to 6.0 mm.

In 97 specimens of left superior maxillary bone or 25.53 per cent the distance from the superior border of the infraorbital foramen to this lower border of the orbit was from 6.5 to 7.0 mm.; in 86 cases, or 22.63 per cent. this distance was from 7.5 to 8.0 mm.; while in 68 cases, or 17.89 per cent. the distance was from 5.5 to 6.0 mm.

In 52 cases, or 13.68 per cent, on the right side the distance from the lower border of the alveolar process to the lower border of the infraorbital

foramen measured from 30.0 mm. to 30.5 mm.; 49 cases, or 12.90 per cent, measured from 28.0 to 28.5 mm.; 45 cases, or 11.84 per cent, measured from 31.0 to 31.5 mm.

This measurement was taken on a line vertical to or at right angles to the alveolar border.

On the left side 54 cases, or 14.21 per cent, this measurement was from 30.0 to 30.5 mm.; 47 cases, or 12.37 per cent, measured from 31.0 to 31.5 mm.; 44 cases or 11.58 per cent measured from 29.0 to 29.5 mm.

As a result of these observations we may conclude that the upper border of the infraorbital foramen is commonly located 4.5 to 10.0 mm. below the lower border of the orbit and the lower border of the foramen is situated 36.0 to 34.5 mm. above the alveolar border.

Statistical observations indicate that this foramen on the left side, in 247 cases, or 65 per cent of all those examined, is located above the upper second premolar. In 52 cases, or 13.68 per cent it was located above the space between the upper first molar and the upper second premolar (Table II).

TABLE II

LOCATION OF THE INFRAORBITAL FORAMINA

Above	CASE		PERCENTAGE	
	Right	Left	Right	Left
1 pm.	17	4	4.47	1.05
1 Δ 2 pm.	3	8	0.79	2.11
2 pm.	289	247	76.05	65.00
1 m. Δ 2 pm.	50	52	13.16	13.68
1 m. m. b. r.	15	44	3.95	11.58
1 m. between m. b. r. – d. b. r.	6	25	1.58	6.58

NOTE: 1 pm.—First premolar.
1 Δ 2 pm.—above the space between first and second premolar.
2 pm.—second premolar.
1m. Δ 2 pm.—above the space between first molar and second premolar.
m. b. r.—mesiobuccal root.
bet., m. b. r. and d. b. r.—space between mesiobuccal and distobuccal root.

On the right side in 289 cases, or 76.05 per cent, this foramen was located above the upper second premolar, while in only 50 cases, or 13.16 per cent, it was located above the space between the upper first molar and the upper second premolar (Table II).

Combining the statistics of both right and left sides, the infraorbital foramen occurred in 536 cases, or 70.53 per cent, above the upper second premolar; in 102 cases, or 13.42 per cent, the foramen was found above the space between the first upper molar and upper second premolar.

From these observations it may be said that the infraorbital foramen usually is found above the upper second premolar and the next most common position is above the space between the upper first molar and upper second premolar (Table II).

In 71 cases, or 18.68 per cent, the infraorbital foramen was located the same distance below the orbital fossa on the two sides and in 59 cases, or 15.53 per cent, it was located the same distance above the alveolar border on both sides.

LOCATION OF THE POSTERIOR PALATINE FORAMEN

In locating the posterior palatine foramen I have measured from a point on the alveolar border between the upper first incisors to the posterior border of the posterior palatine foramen.

I have also measured from a point on the alveolar palatal ridge opposite the middle of the third molar to the anterior border of the posterior palatine foramen.

As a result of these measurements I have found that 65 cases, on the right side, or 17.11 per cent, measured 54.0 to 54.5 mm. from this point on the alveolar border between the first incisors to the posterior border of the posterior palatine foramen.

In 44 cases, or 11.58 per cent, this measurement was 55.0 to 55.5 mm. and in 39 cases, or 10.26 per cent, this measurement was 53.0 to 53.5 mm.

On the left side 53 cases, or 14.21 per cent, this measurement was 53.0 to 53.5 mm.; in 44 cases, or 11.58 per cent, the distance measured 54.0 to 54.5 mm. and in 41 cases, or 10.79 per cent, the distance measured 52.0 to 52.5 mm. We may assume that the foramen is located at from 50.0 to 57.5 mm. on the right side and 50.0 to 58.5 mm. on the left side from the point on the alveolar border between the two upper first incisors, but we should bear in mind the variations where we find the distance as short as 31.5 mm. and as long as 69.0 mm.

In locating the posterior palatine foramen I have also measured from a point on the alveolar palatal ridge opposite the middle of the third molar to the anterior border of the posterior palatine foramen.

On the right side 60 cases, or 15.79 per cent, this measurement was 16.0 to 16.5 mm.; 53 cases also on the right side, or 13.95 per cent, the distance was 15.0 to 15.5 mm.; 45 cases, or 12.11 per cent, the distance was 14.0 to 14.5 mm.; 44 cases or 11.58 per cent the distance was 1.30 to 13.5 mm.

On the left side 65 cases, or 17.11 per cent, this distance was 15.0 to 15.5 mm. and in 51 cases, or 13.42 per cent, this measurement was 16.0 to 16.5 mm.; 43 cases, or 11.32 per cent, this measurement was 12.0 to 12.5 mm.; 42 cases, or 11.05 per cent, the distance was 13.0 to 13.5 mm.

We may assume from these records that the anterior border of the posterior palatine foramen is 11.0 to 19.5 mm. on the right side and 11.0 to 18.5 on the left side from a point on the alveolar palatal border opposite the middle of the third molar.

In 59 cases, or 15.53 per cent, of all those measured on both sides the posterior palatine foramen is symmetrically located in relation to a point on the external alveolar border between the upper two first incisors, and also the foramen is commonly located 50.0 to 57.5 mm. on the right side and 50.0 to 58.5 mm. on the left side from a point on the alveolar border between the upper first incisors.

SUMMARY

1. The upper border of the mental foramen of the human mandible is commonly located from 10.5 to 18.0 mm. in a vertical line directly below the external alveolar process in stated classes.

From the lower border of the mental foramen to the base of the mandible on both sides the distance is 11.5 to 16.0 mm.

The most common location, in relation to the teeth, was below the lower second premolar; the second common location was below the space between the lower first and the second premolar.

2. The anterior ridge of the mandibular foramen on both sides is located from 76.0 to 86.0 mm. posteriorly from a point on the alveolar process between the two lower median incisors. The distance from a point on the crest of the internal oblique line directly opposite the lower third molar to the superior spine-like border of the mandibular foramen is 7.0 to 13.5 mm.

3. The inferior border of the infraorbital foramen is commonly located on both sides from 26.0 to 34.5 mm. above the lower border of the upper alveolar process. The superior border of the infraorbital foramen on both sides is located from 4.5 to 10.0 mm. below the orbital rim. The most common location, in relation to the teeth, was above the upper second premolar; the second most common location was above the space between the upper first molar and the second premolar.

4. The posterior border of the posterior palatine foramen is commonly located from 50.0 to 58.5 mm. posteriorly from a point on the alveolar border between the upper first incisors.

The anterior border of the posterior palatine foramen is located from 11.0 to 19.5 mm. below a point on the alveolar palatal ridge opposite the middle of the third molar.

The location of all the dental foramina, strictly speaking, are not always symmetrically located on both sides.

Finally, I wish to express my great thanks to Dr. M. J. Greenman, Director of the Wistar Institute, and also Dr. Clark Wisler of the American Museum of Natural History of New York, who kindly permitted me to have a large number of skeletons.

THE COMPLETE DECIDUOUS DENTITION AT THE ERUPTION OF THE FIRST PERMANENT MOLARS: ITS IMPORTANCE IN DIAGNOSIS AND CLASSIFICATION*

By G. F. Cale Matthews, L.D.S., Birmingham, England

THIS paper is an endeavor to elucidate some of the possible factors which make for a malocclusion, not only when the deciduous dentition is erupted, but at the approximate time of eruption of the first permanent molars.

Orthodontia, though young as a science, is seeking a definite etiology and formulas for treatment.

Enquirers are searching in all fields of related science, such as anatomy, biology, anthropology, and physiology, to name only some of the kindred and allied subjects. How far these researches will lead, it is impossible to prophesy. Humanity by its racial mixture, by its habits, and by its surroundings, is influenced in its growth both physically and mentally. Research into the past is called to our help; mathematical science is asked to yield some aid, whereby we may classify and place the varying types of malocclusion. It is not sufficient that the obvious may be regarded as satisfactory for diagnosis.

If this research is placed in its proper perspective, if the mathematical instruments are to be an aid in treatment, there must be at the same time, a clear clinical understanding of the anatomic and biologic factors.

There is a definite growing organism to be treated, and at present it can be treated only in so far as we have knowledge of growth which yet maintains the condition of stability, for however complex the units of a dentition may be placed in their irregularity, their rigidity is maintained—unless disease attacks them. Such disease is not for our consideration at this time.

Thus it seems we should give more study to the elementary stages of our developing malocclusions by means of the deciduous dentition, having also regard for the factors which may be encountered later, and so place the known facts, that surprise shall not overwhelm us when development reveals something which should have been foreseen.

Apart from a cursory reference, few of the textbooks on orthodontics place any importance on the deciduous dentition. It has passed away in many of the cases presented for treatment. The advice given is that the deciduous dentition shall be maintained in health and usefulness; but no help is given to the general practitioner, who has the best opportunity of inspecting, and whose records would prove of inestimable value if carefully taken.

*Read before the First International Orthodontic Congress, New York City, August 16-20, 1926.

Few of us will have the opportunity of treating and observing more than two generations of children, and the variations in those may be so considerable as to nullify any standard of coordination.

The deciduous dentition must be the guiding factor in the establishment of a permanent occlusion, and its variation from the normal average must not be disregarded. Treatment should be designed to train and support the structures which are embodied in the surroundings of the dental machine.

We are now reconciled to the idea, through close and careful observation, that perfect occlusion is a practical impossibility—that which a few

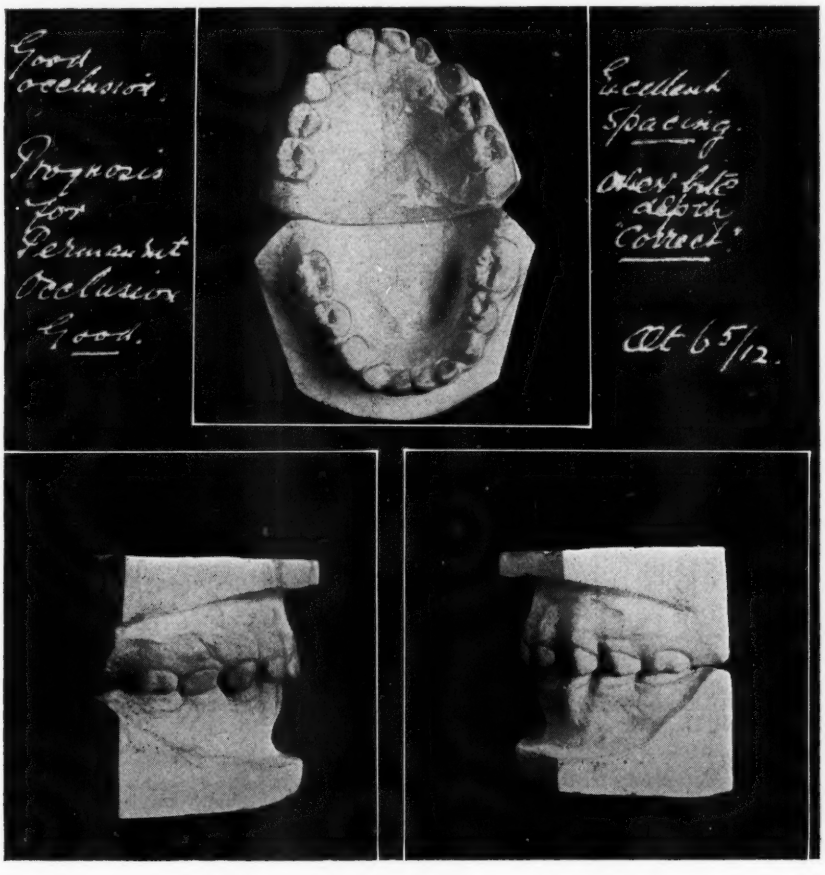

Fig. 1.

years ago was regarded as an ideal to be obtained, is impracticable—and that we must substitute for the ideal, the word "normal," meaning occlusion which is within the standard deviations from the ideal; or some definition that will give the meaning of a good working occlusion, so formed as to be in accord with the general physical characteristics.

The deciduous dentition has characteristics which may be of considerable help to the orthodontist, if carefully studied. That irregularity of its occlusion is more frequent than was formerly recognized is acknowledged.

Without entering into the possible causes of a malocclusion of the deciduous dentition, we will start our survey at its completion, keeping in the forefront of our thoughts the ideal, irrespective of its possible malocclusion.

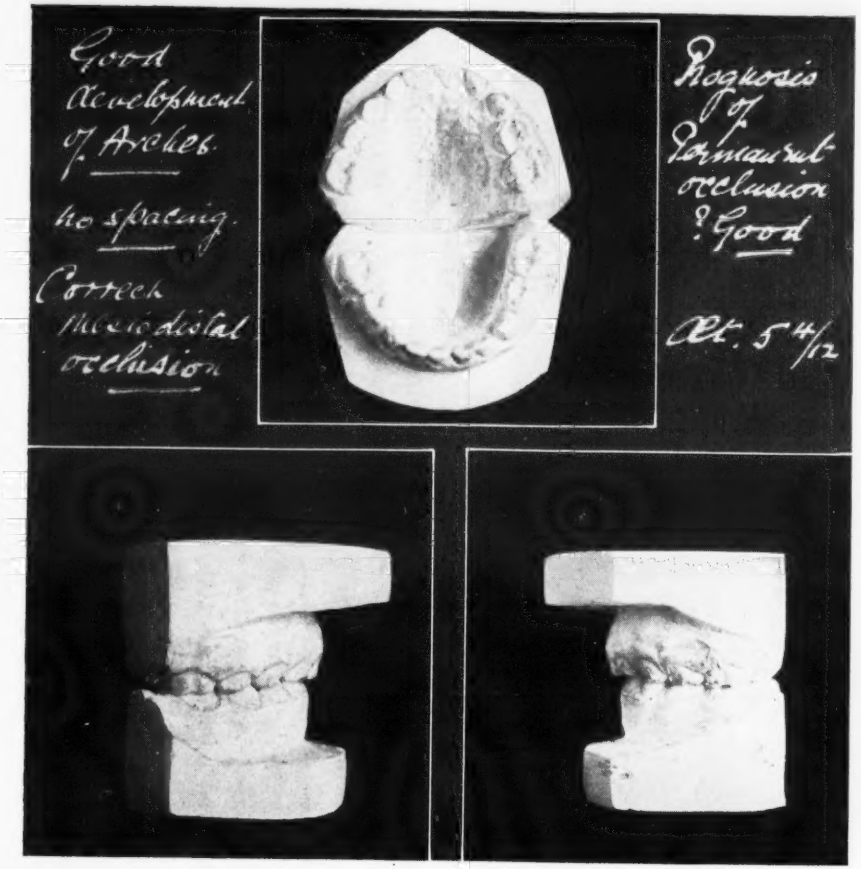
Good development of Arches.
no spacing.
Correct mesio-distal occlusion
Prognosis of permanent occlusion ? Good
Aet. 5 4/12

Fig. 2.

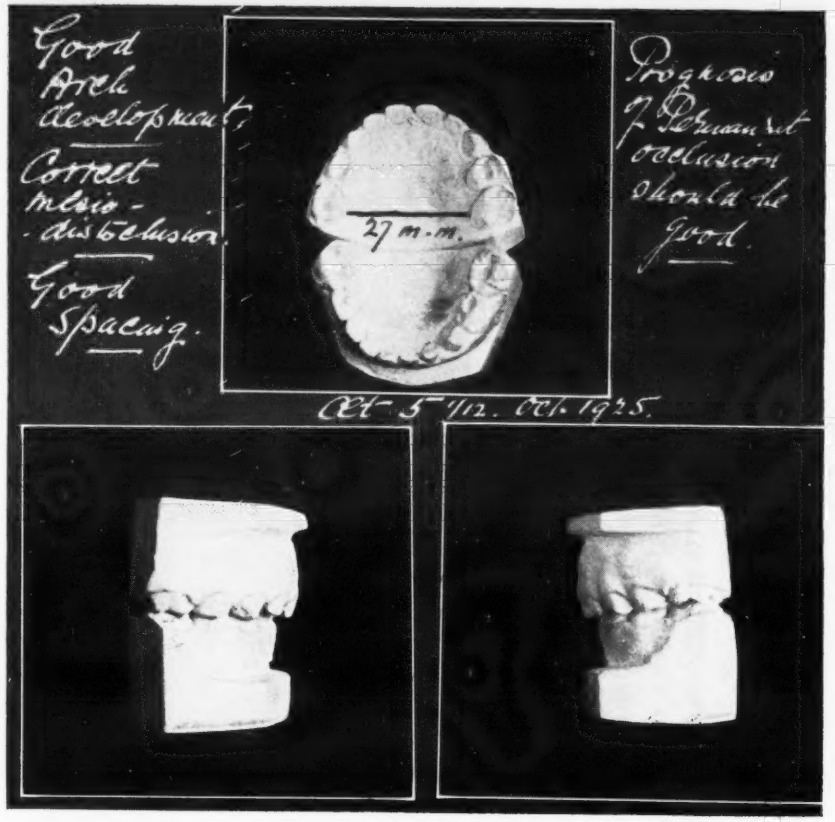
Good Arch development
Correct mesio-distocclusion.
Good Spacing.
27 m.m.
Prognosis of Permanent occlusion should be Good.
Aet- 5 4/12. Oct. 1925.

Fig. 3.

The deciduous dentition is normally complete by the end of the second year, and an abrupt termination of this dentition with an exact and definite evenness at the distal surfaces of the second molars takes place; generally speaking, any deviation from the normal is anterior to these molar teeth; i.e., the occlusion in the molar region is normal mediodistally in the majority of cases, and a lingual or buccal deviation is more common than an anteroposterior one.

Unfortunately, the practicing orthodontist has not the opportunity of studying malocclusion in the deciduous dentition to the same extent as in the permanent dentition. Bogue was among the first to call attention to the possibility of the influence of malocclusion in the deciduous, on the permanent dentition. Northcroft has never ceased to bring this into prominence.

The accompanying illustration (Figs. 1-15) will give some of the more frequent types of malocclusion. These models are a running sequence of patients presenting themselves for treatment, and have not been specially selected as marked instances of malocclusion.

The permanent dentition is of greater importance to the individual than its predecessor. It is designed to withstand the utmost demands made upon it. Theoretically, it should be efficient throughout the life of its owner, but through varying causes this is not so. Those causes and results are in the hands of the general practitioner for removal and repair. The orthodontist is concerned with the perfecting of faulty occlusion, mainly in the permanent dentition. The perfect development, as described by normal, cannot follow on a faulty predecessor.

The deciduous dentition is only recently receiving consideration in regard to the relation it bears to its successor. Today, by the great majority of parents, it is regarded as a passing incident, something to tide over the time in the life of a child which is in itself unimportant, entirely oblivious of the conditions which underlie those very beautifully arranged units, which are so designed that they occupy all the available space, and are perfectly efficient to perform the function demanded of them during an important developmental period, when the child is growing rapidly, and when all is "*grist which comes to the mill.*" The healthy child is not particular; anything which can be eaten is taken with an utter disregard to its nutritive or digestive properties; and this is a natural instinct with very definite and desirable results. The more varied the diet, the more varied are the muscular movements necessary to masticate that diet; hence, we get that stimulation which makes for growth and power of muscle.

The orthodontist is more definitely concerned with the permanent dentition, and is not called upon either to treat or to examine the deciduous teeth with any comparable relation in numbers. Still, it is necessary that we should have a very clear understanding of the importance of this disappearing, but very influential factor, in the ultimate building of a more elaborately designed and powerful machine.

The deciduous dentition being generally complete by the end of the sec-

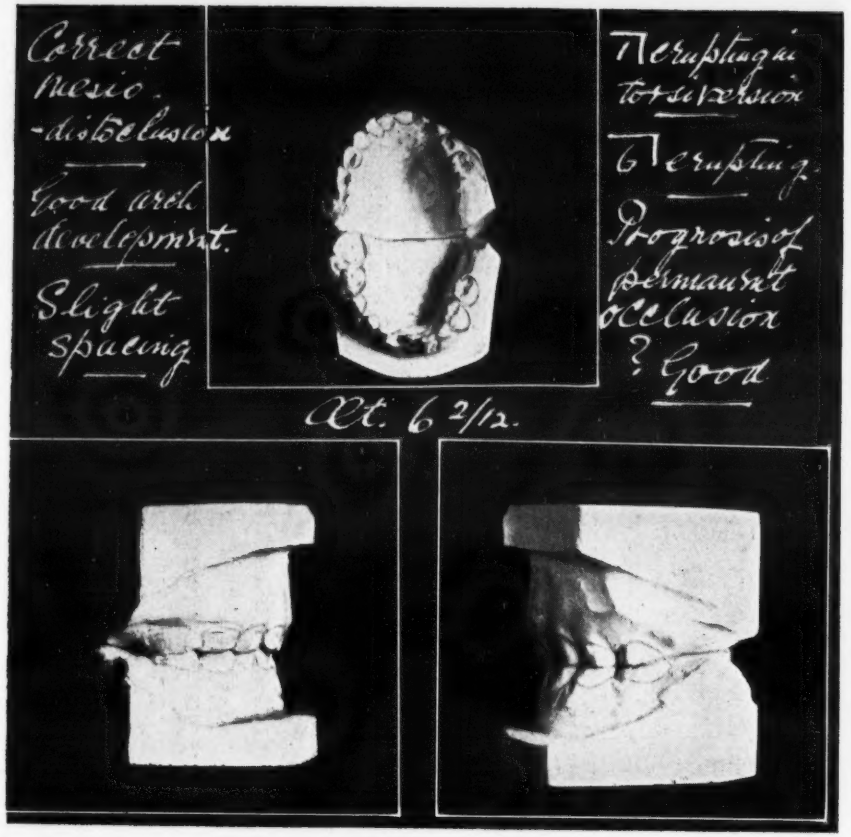
Correct
Mesio-
-distoclusion
Good arch
development.
Slight
spacing
Æt. 6 2/12.
1 Erupting in
torsiversion
6 erupting.
Progress of
permanent
occlusion
? Good

Fig. 4.

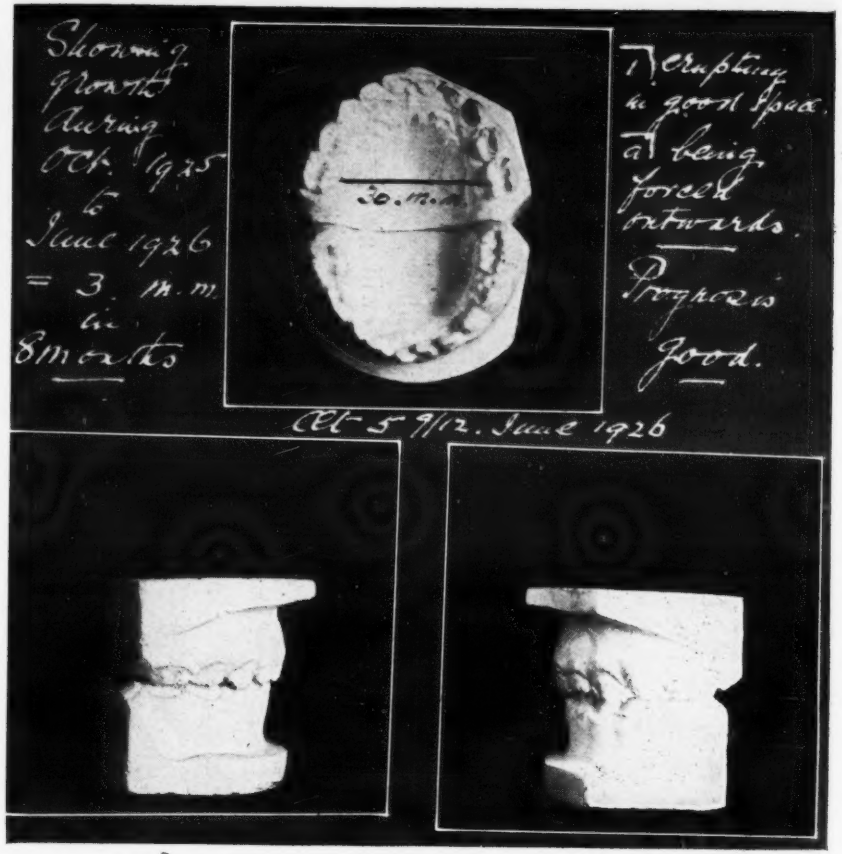
Showing
growth
during
Oct. 1925
to
June 1926
= 3 m.m.
in
8 months
30. m.m.
1 Erupting
in good space.
a being
forced
outwards.
Progress
good.
Æt 5 9/12. June 1926

Fig. 5.

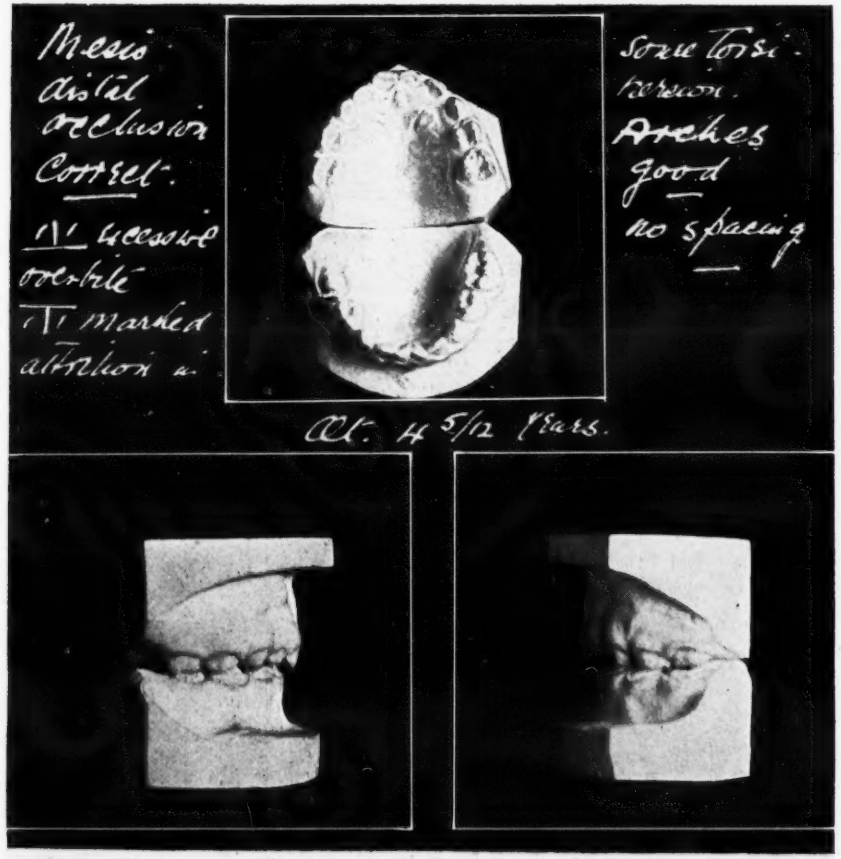
Mesio distal occlusion Correct.
R I Excessive overbite
L I Marked attrition in
Some Torsi torsion.
Arches good
no spacing
Act. 4 5/12 Years.

Fig. 6.

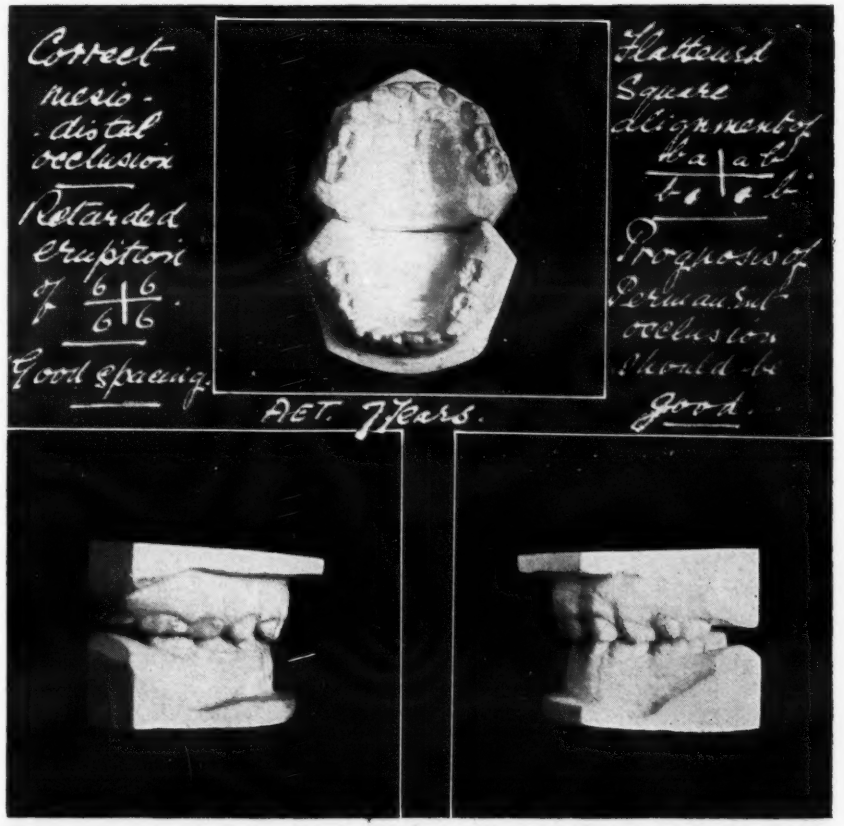
Correct Mesio-distal occlusion
Retarded eruption of 6|6 / 6|6.
Good spacing.
Act. 7 Years.
Flattened Square alignment of
b a | a b
b c | c b
Prognosis of Permanent occlusion should be Good.

Fig. 7.

ond year, we should ask ourselves, what has been its mission during that time?

For the first six months, the infant should be nourished by the mother, and until that time has elapsed, no teeth are either necessary or visible; but very soon afterwards, a rapid succession of teeth and growth occur, so that at the end of the second year, the child is well-equipped and able to support itself by a complete dentition of twenty very beautifully designed and capable units, so arranged in the maxillae and mandible, that their utility is all that is needed.

This condition exists, or should do so, until the sixth or seventh year, when additions and loss commence. (I am presuming throughout this paper that we eliminate any consideration of caries, and that we are not concerned with any abnormal or pathologic condition in the individual teeth.)

We know that at birth the crowns of the deciduous incisors, the cusps of the canines, and the masticating surface of the molars are calcified; also 24 of the germs of the permanent teeth are present, and the first permanent molar has begun to calcify.

Here are all the elements of a future developing malocclusion, if we realize the various factors which may operate in development in the next twelve years; i.e., to the eruption of the second permanent molars and the completion of the denture from the orthodontist's clinical side.

Again, at the completion of eruption, the child has passed the stage of infant care and nurture; he is able to take the ordinary food provided, and under primitive conditions could forage for himself.

From the third to the sixth year, there is a remarkable condition of things. The permanent tooth germs are gradually calcifying, and are in varied degrees of crown completion, according to the period of their sequence. The first permanent molars are complete in crown and half of their roots are formed; the crown is only covered by gum, the crypt being fully open; the second permanent molars are well on their way, and the crown is almost completely calcified. These latter are both behind and independent of the deciduous teeth.

All this time great stress and strain have been placed upon these deciduous structures, which, despite the wasting of their roots, are fulfilling their functions of guiding their successors and disappearing from below upward, so that their ultimate fate is one of voluntary and easy quittance, which should leave their successors exposed, and eager to take their places.

It is both a wonderful and instructive indication of law and order, and leaves us just where we were at the beginning as to how all this happens: We have no definite knowledge of the actual forces of eruption, and there is no other development from which we can make comparison.

It is obvious that the additions which have occurred in the change of the internal arrangement from germ to calcified crown, must have more room and strength.

The mandible, by its simpler and more definite alignment, affords an easier illustration than the maxillae. It has added to its depth, length, and width.

Bone has been deposited beneath; it has grown anteroposteriorly, and the

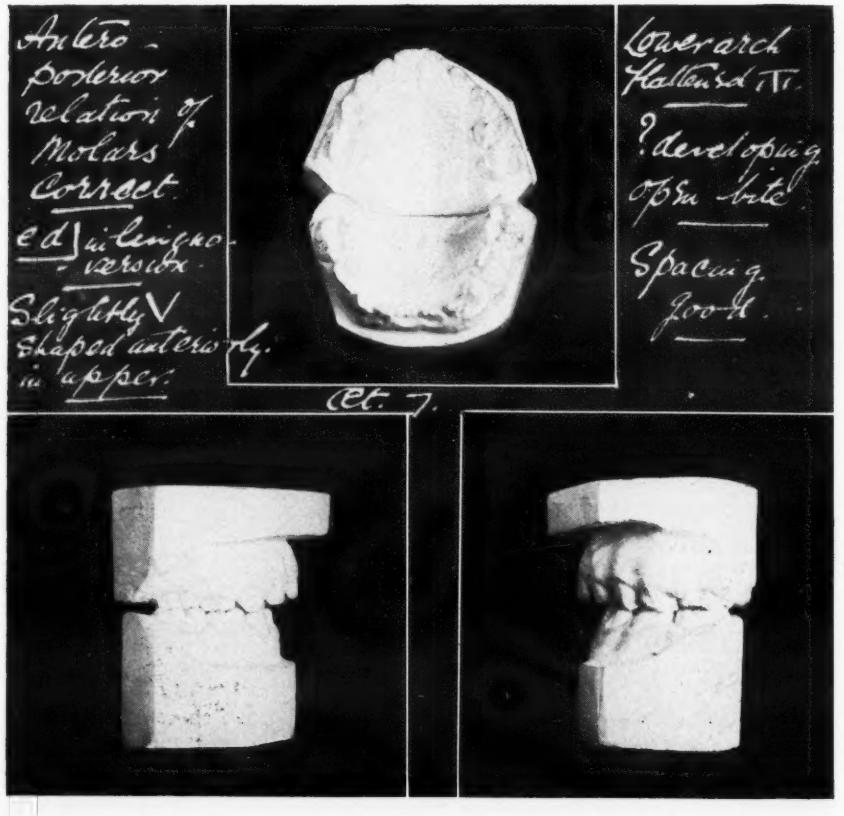
Antero-posterior relation of Molars Correct
ed] mi lingno-version
Slightly V shaped anteriorly in upper.
Lower arch flattened ant.
? developing Opn bite
Spacing good
Æt. 7.

Fig. 8.

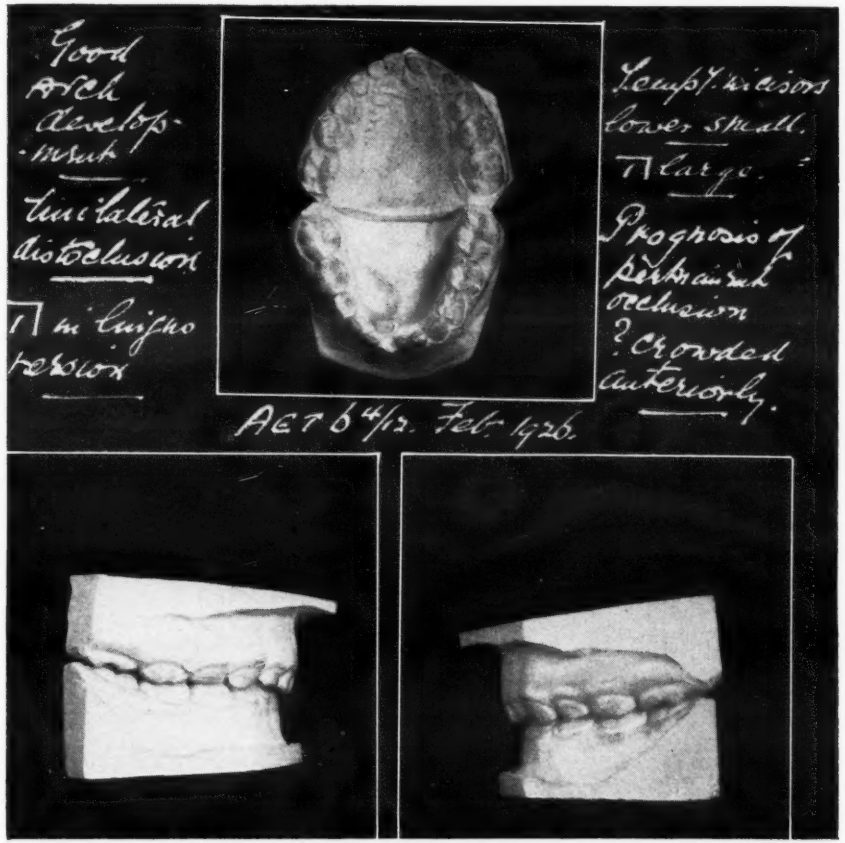
Good arch development
Unilateral distoclusion
] mi lingno version
Incisors lower small.
] large.
Prognosis of permanent occlusion ? Crowded anteriorly.
Æt 6 4/12. Feb. 1926.

Fig. 9.

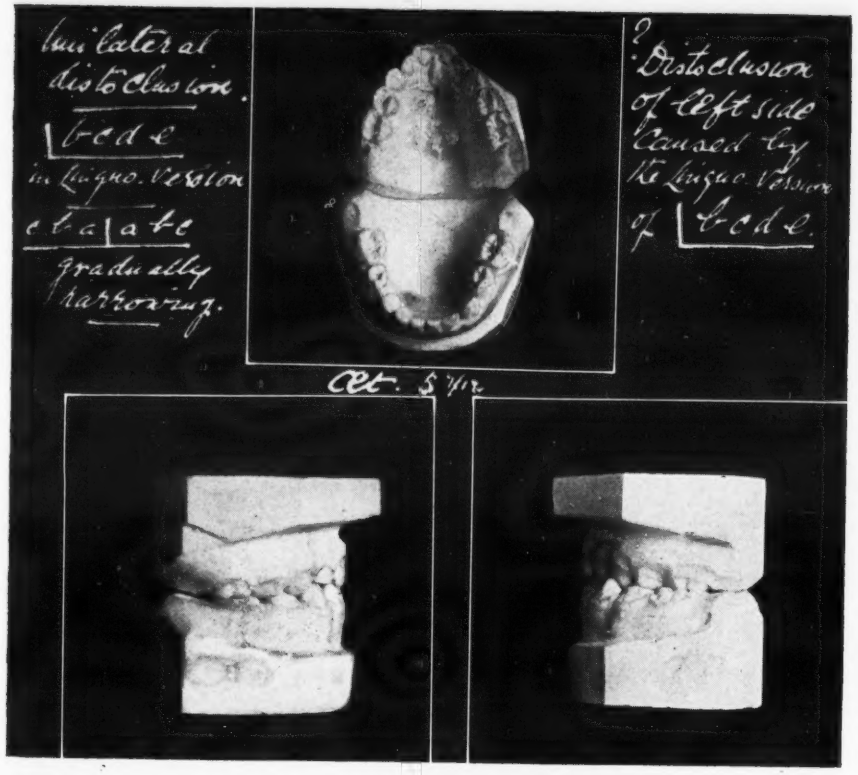
bilateral
disto clusion.
bcde
in ligno. version
cbabte
gradually
narrowing.
?. Disto clusion
of left side
Caused by
Re lingue version
of bcde.
Oct. 5th 02.

Fig. 10.

Good
Arch
development.
bilateral
disto clusion.
occlusal
plane
distal
Oct. 9th 02.

Fig. 11.

body of the bone has also increased laterally. The alveolus is greater, and its flow must have synchronized more rapidly than the growth of the body bone. Brash has clearly shown, and it has been my privilege both to see and to handle his madder-fed specimens, that as growth occurs, the teeth move forward as well as vertically, the position of the sockets of the anterior roots of the molars are ultimately occupied by the posterior roots, and so on right through. Whereas absorption occurs in the angle of the mandible, to give space, there is growth or deposition behind to give strength. However, the main interest to the orthodontist is, that while these changes are occurring, *the occlusal plane remains unaffected.* There is increased depth (Fig. 19) from the occlusal plane to the lower border of the mandible, but both the deciduous teeth and the first permanent molars are in occlusion; and this condition will be maintained until the loss of e d | d e when their responsibility will be taken over by 5 4 | 4 5.

The normal occlusal plane at the end of the sixth year, or at the eruption of the first permanent molars is inclusive—the distal surfaces of the e's being level vertically, yet the molars are gradually adapting themselves to such a position that they may attain cuspal relation, in which the anterior cusp of the 6 | 6 is anterior to that of 6 | 6.

This accommodation may be due to the occlusal plane adopting an upward curve, slight but of sufficient degree so that the distinct cuspal shape of the upper and lower molars may fulfill their greatest efficiency. At any time after this, by the forward flow of the alveolar border, together with the action of the curve, the lower molars are taking up an anterior position, and are in a relation as described by "normal."

If this is so, how does a distoclusion develop in the relation of the permanent first molars which has no bearing on the jaw relationship, as indicated in the temporary occlusion?

It can only be by:

1. Premature eruption of one or another of the molars. The premature eruption of a first permanent molar, rising above the occlusal plane of the deciduous dentition, may so stabilize its position, as to prevent the full eruption of its antagonist.

2. An unusual *levelness* of the occlusal plane. The effect of a perfectly level plane of occlusion embracing the first permanent molars may give a point to point cusp occlusion, which may then develop medially or distally.

3. Failure at the physiologic moment of a cusp lock. It may be that the correct relation of an anteroposterior occlusion of the first permanent molars is brought about by a slight backward and vertical growth of the upper molar; this back and upward or downward growth may also fail.

4. An interference with alveolar growth anteriorly. There is evidence that the "alveolar flow" must accommodate itself to the growth of the permanent teeth within the body of the bone. Any interference with alveolar growth will cause displacement of the teeth *within the alveolus.*

The alveolar growth occurs to compensate for the separation which would otherwise be brought about by the increase of the height of the ramus. The same thing applies to the maxillae. It is less in the latter, because body

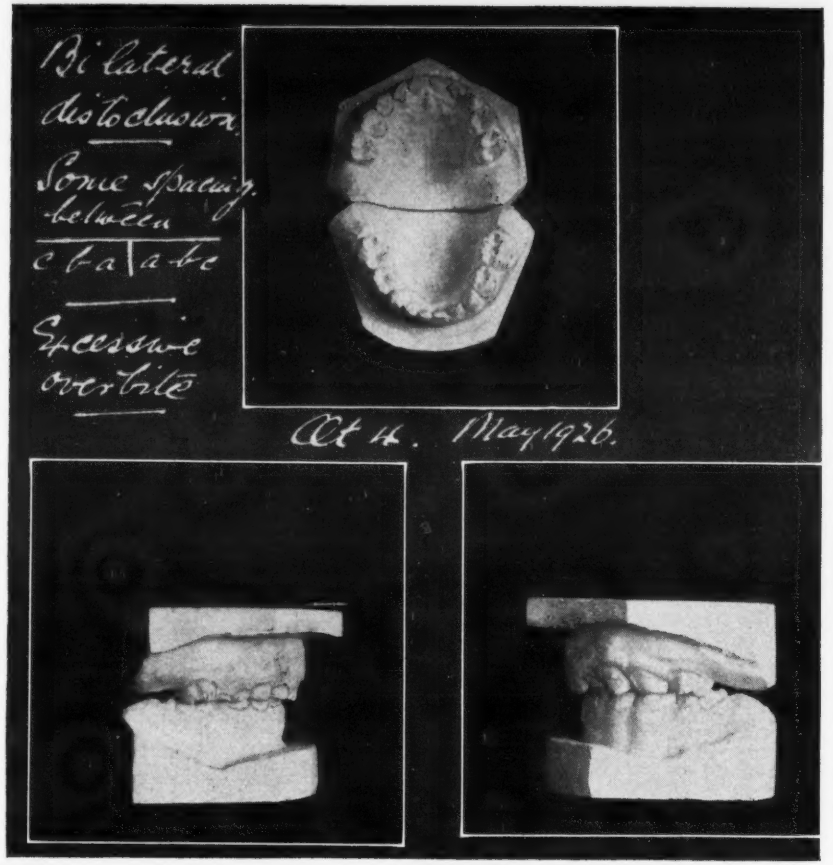
Bilateral
disto clusion
Some spacing
between
c b a | a b c
Excessive
overbite
Ætat. May 1926.

Fig. 12.

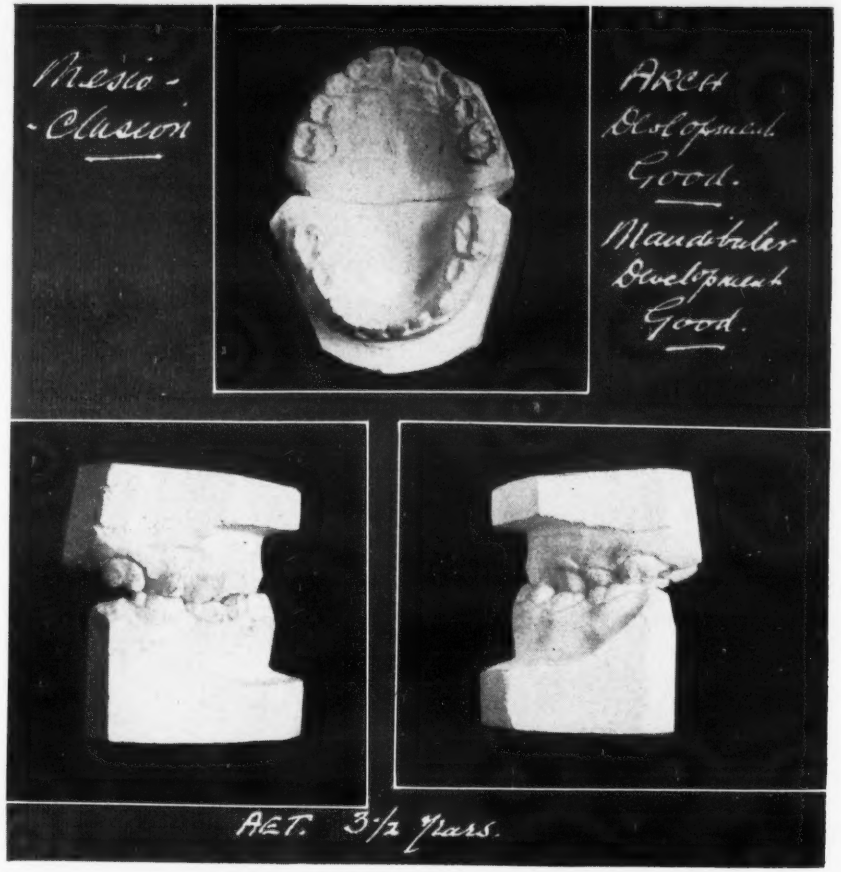
Mesio-
-clusion
Arch
Development
Good.
Mandibular
Development
Good.
Æt. 3½ Years.

Fig. 13.

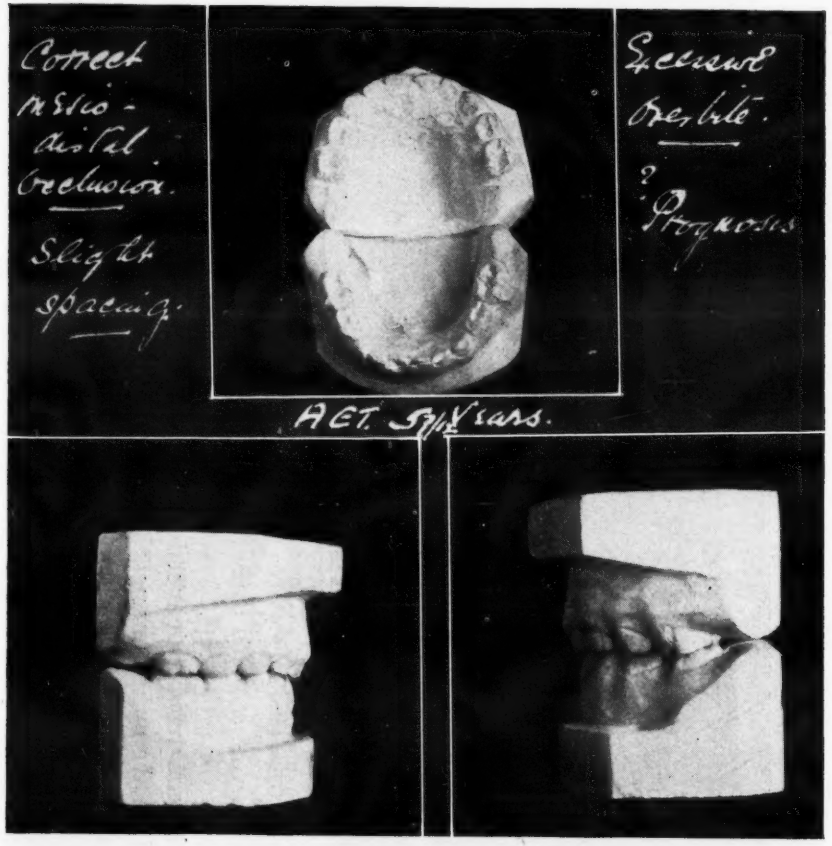
Correct
Mesio-
distal
occlusion.
Slight
spacing.
Excessive
Overbite.
? Prognosis
AET. 5 1/2 years.

Fig. 14.

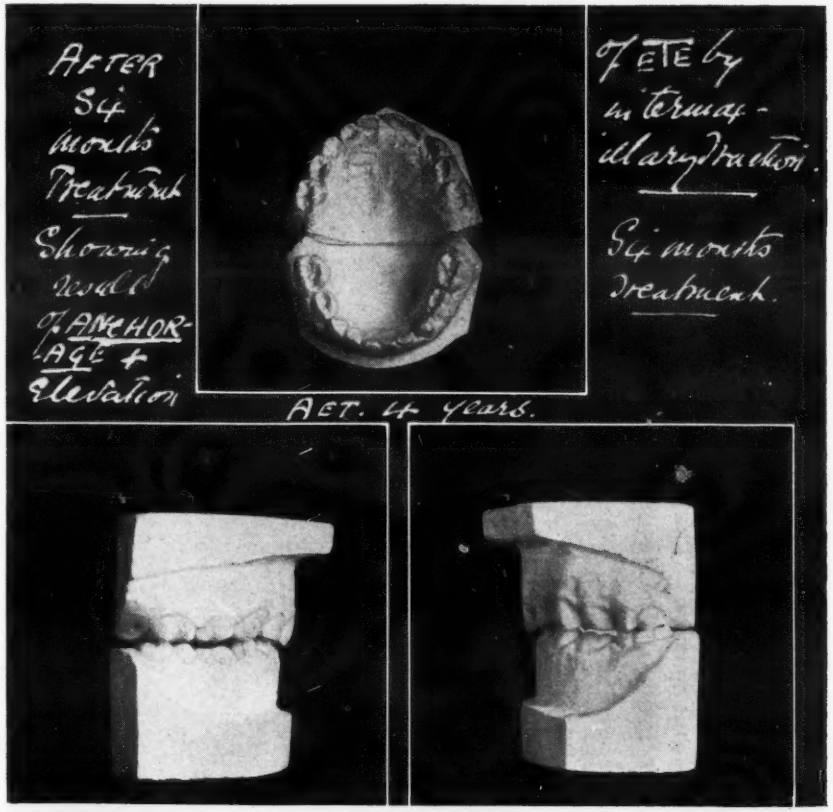
After
Six
months
Treatment
Showing
need of
ANCHOR-
AGE +
Elevation
Effected by
intermax-
illary traction.
Six months
treatment.
AET. 4 years.

Fig. 15.

growth would have the effect of lowering the occlusal plane also, since the maxillae grow away from their attachments above. Brash has evidence of madder-fed specimens to show the difference in amount of the alveolar growth in mandible and maxilla. The unity of the occlusal plane is unaffected by this alveolar growth, due to eruption of first permanent molars, so far as it is vertical.

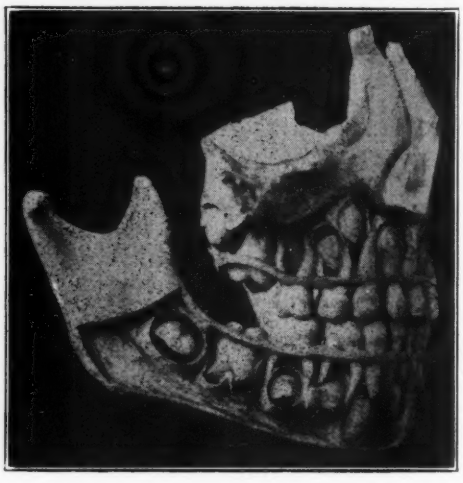

Fig. 16.—The maxilla and mandible at the end of the second year. (Odontological Museum, Royal College of Surgeons, England.) Bennett's Science and Practice of Dental Surgery.

Fig. 17.—The maxilla and mandible between the third and fourth years. (Odontological Museum, Royal College of Surgeons, England.) Bennett's Science and Practice of Dental Surgery.

Fig. 18.—The maxilla and mandible at the sixth year. (Odontological Museum, Royal College of Surgeons, England.) Bennett's Science and Practice of Dental Surgery.

Fig. 19.—The maxilla and the mandible at the ninth year. (Odontological Museum, Royal College of Surgeons, England.) Bennett's Science and Practice of Dental Surgery.

If the conclusions deduced from these madder-fed specimens are correct, it would not be either unscientific or dogmatic to assume that the same result could be shown in the madder-fed child, apart from the difficulty of demonstration; the x-ray demonstration of growth helps us to understand the forces which are at work.

If any interference with growth during the period of development in the deciduous dentition occurs, it should be safe to assume a complication in the development of the permanent dentition.

I wish to emphasize the necessity of more careful observation of the deciduous occlusion. Malocclusion in the permanent dentition must be inevitable if any irregularity of occlusion is present in the deciduous dentition. In those cases in which observation is possible, this result should be foreseen and should be treated in the earliest stages of its development. The critical stage is at the eruption of the first permanent molars.

At present, the difficulties are the absence of any statistical records as to the incidence of the average, and the difficulty of observation due to lack of opportunity. The orthodontist is called upon to treat the permanent dentition, but rarely has the opportunity of studying the variations in the deciduous. The reasons for this are obvious. Unless manifest irregularity is present, the parent is unconscious of the necessity of inspection, and until caries or natural loss occurs, the child may be unattended. (Figs. 16-19.)

Normal growth of the deciduous dentition is shown in the accompanying illustrations: a general expansion in all directions is the natural and desired result of development.

The object of this paper is to urge a closer observation of the malocclusions of the deciduous dentition, and to correlate their significance in relation to the permanent dentition.

CONCLUSIONS

1. The deciduous dentition has a permanent and definite occlusion, increasing vertically and laterally by alveolar growth, but remaining steadfast in its plane relationship.

2. The abrupt and vertical termination at the distal surfaces of the second deciduous molars is disturbed by the eruption of the first permanent molars, on account of the outward growth of the alveolar border.

3. The molars take their place in the plane of occlusion by accommodation of the curve of development, which on completion of the permanent dentition is known as the curve of Spee, and is quite independent of relative forward or backward movement.

4. To the practical orthodontist, the deciduous occlusion must be maintained to its normal time; deviations should be corrected, and *the path of development of the permanent molars should be noted*, and if irregular, trained into position.

5. Early treatment is desirable for the permanent correction of developing malocclusions; a manifest irregularity, developed by the end of the sixth year, may give the key to further and more difficult corrections.

6. These conclusions are based on the complete occluding deciduous dentition, unaffected by pathologic conditions, and only varied by normal loss, which is made good by succeeding teeth, and in some measure by the cuspal development of individual teeth, whereby the anteroposterior lock is maintained.

7. Preventive medicine is being practiced, and its value is gradually

gaining in the public mind; the medical profession has already acknowledged its importance.

Despite our knowledge of eugenics, dietetics, and some of the etiologic and biologic factors, it is impossible to teach "preventive malocclusion." No scientific formulas will induce a change in human nature, whereby a choice of mating will produce the perfect specimen of humanity.

It is therefore essential that we, as orthodontists, should assemble our "causes," and in the forefront of these, as a diagnostic factor, place the occlusion of the deciduous dentition.

From this we should learn some of the fundamental causes of a future malocclusion and, in some cases, be able to prevent the very serious results of a simple forerunner, as evidenced in the deciduous dentition.

Malnutrition before birth, and in early infancy; marriage of opposing types, giving the blend of individual characteristics, may furnish a key to the problem, which should be evident in the deciduous occlusion.

DISCUSSION

Dr. Frank A. Delabarre.—I wish to express the heartiest accord with the ideas and conclusions of the essayist. By a very curious coincidence I had started and almost completed a study along this same line before his paper, which I had promised to discuss, arrived. In as much as the questions involved in this study apply directly to the paper, my figures and conclusions are submitted as a discussion.

The field of the study was the evidences of malocclusion occurring in patients seven years of age and younger. The group totaled 338 cases gathered from four sources, 202 from dental clinics, and the balance from cases examined for or undergoing treatment.

The characteristics of malocclusion that were checked up were those commonly found in older, more complicated cases, and in a more pronounced form. The exceptional indications were excluded. Results are expressed in percentage of occurrence. The accompanying table shows the indications studied, arranged in the order of frequency.

1. Bogue index of 28 mm. or less occurred in_____ 66.0 per cent of cases
2. Disturbance of arch curve occurred in_____ 58.8 per cent of cases
3. Lack of incisor spacing between 4 and 6 occurred in___ 53.8 per cent of cases
4. Deviation of the incisor median lines occurred in_____ 44.6 per cent of cases
5. Excessive overbite occurred in_____ 30.0 per cent of cases
6. Disturbance of the anteroposterior relation occurred in 19.0 per cent of cases
7. Open bite occurred in_____ 15.0 per cent of cases
8. Cross bite occurred in_____ 9.7 per cent of cases

The following results, not shown in the table, were obtained:

The average age was four years, seven months.

The largest Bogue index was 33, the smallest 21, and the average 27.6 mm.

The largest canine index was 26, the smallest 17, and the average 21.6 mm.

Only 9 per cent of the cases had but a single indication; one case had seven, the highest possible number. The average number for the group was 2.9 per case.

My conclusions from the studies of the results obtained are as follows:

1. The Bogue index is dependable and 28 mm. is a fair, low measure.
2. The canine index parallels the Bogue index, but more research is necessary to establish its bounds and the low measure.
3. Disturbance of the arch curve is frequent, and when it occurs it is coupled with a low Bogue index in 87.87 per cent of cases.
4. Lack of incisor spacing between 4 and 6 is an important indication and is coupled

with a low Bogue index in 86.1 per cent of its occurrence. It is an evidence of an existing or previous arrest of development in the lateral direction.

5. Deviation of the incisor median lines is more than an occasional indication, and because of the serious maldevelopment that may follow and the consequent technical difficulty of reduction, it should be given a place of more importance in diagnosis.

6. Excessive overbite whether interpreted as elongation of the incisors or as lack of vertical growth of the posterior teeth, presents a technical problem which is hard to handle. It occurs in 30 per cent of cases.

7. Disturbance of the anteroposterior relation of the mandible, the basis of the Angle classification, needs no comment as its importance is accepted. Its occurrence is 19 per cent.

8. Open bite, or persistent nonocclusion, occurs only occasionally but is none the less important. I believe it is attributable to perverted functional habit of the tongue, lip, cheek, or fingers.

9. Crossed bite is too evidently a positive indication to need special mention, but it is comparatively rare.

10. It is rare to find but a single indication present. The relative importance of any indication is in direct ratio to the frequency of its occurrence. The diagnosis of any case is more positive in proportion to the number of indications present and to the relative frequency of appearance.

11. The indications that occur with greatest frequency are those that would result from the larger etiologic factors, such as heredity, nutritional disturbances, and organic or functional disorders, rather than from purely local or mechanical causes.

12. It is possible to detect the evidences of developing malocclusion early in life and in many cases to make a positive diagnosis as such.

13. In view of the known tendency of malocclusion to grow progressively worse with age, it is logical to say that treatment is indicated as soon as possible after a positive diagnosis is made.

Dr. Cale Matthews.—I thank Dr. Delabarre for treating me so kindly. His statistics will probably prove of far more value and interest than my paper, which obviously to you, and purposely for me, avoided figures. I want, and endeavor, in any opportunity which presents itself to me, to emphasize the desirability and necessity of observation, and not necessarily a scientific observation, but to combine with the necessary scientific observation a cultivation of the art sense, and I think in such a specialty as orthodontia it is quite a possibility that we may, if we are not careful, lose that sense of art development which should go with our scientific and mathematical consideration of the condition that exists.

OCCLUSION. OBSERVATIONS ON ITS DEVELOPMENT FROM INFANCY TO OLD AGE*

By Sheldon Friel, Dublin, Ireland

INTRODUCTORY

THE term occlusion refers to the relationship of the teeth of the maxilla and mandible when the jaws are closed and the condyles are at rest in the glenoid fossae.[1]

Occlusion has very frequently been considered as an isolated fact of development uninfluenced by the rest of the organism. It has not been sufficiently realized that normal occlusion of the teeth is the result of many of the same factors which influence and control the growth and development of the whole body; e.g., nutrition, internal secretions, and environment.

VARIATIONS IN THE FORMS OF TEETH

As variations in the forms of individual human teeth may affect the occlusion to an appreciable extent, it is evident then, that the range of variation in normal occlusion must be very considerable, and in the main I propose to hypothesize only an ideal occlusion of definite forms of teeth.

STAGES OF OCCLUSION

Various considerations must be borne in mind in seeking to determine this ideal occlusion. Occlusion changes with the transition from the deciduous to the permanent dentition, and in addition to this major alteration, there are the changes in the occlusion of the deciduous teeth with the growth of the jaws and the wear of the teeth in use, and further the change in occlusion of the permanent teeth as the result of wear.

It is essential therefore to mark at least four stages in the development of ideal occlusion.

1. The occlusion of the deciduous teeth after their complete eruption.
2. The changes that occur in the occlusion previous to the eruption of the permanent incisors and first permanent molars, and the changes which follow the loss of the deciduous canines and the first and second deciduous molars.
3. The occlusion of the permanent teeth in a young adult.
4. The changes which occur in the occlusion as the result of wear.

Although we may postulate a hypothetic ideal occlusion,[1] examination of important individual changes in the relations of the teeth, emphasizes the fact that occlusion is ever changing, the resultant of the growth and continuous interaction of the living tissues. In itself a purely mechanical rela-

*Read before the First International Orthodontic Congress, New York City, August 16-20, 1926.

tionship of teeth, it typifies function. Occlusion obeys the general biologic principle of continuous change.

Speaking of occlusion in a general way it may be noted (1) that each premolar or molar tooth is almost altogether antagonized by its corresponding tooth in the opposite jaw, in unworn teeth; i.e., in a child of two and a half years of age and a young adult. Especially is this true of the lingual cusps of the maxillary teeth and the buccal cusps of the mandibular teeth, those parts of the teeth that come most in contact with their opponents. This, however, is contrary to the views expressed in various textbooks, where the impression given is that each tooth is supported on two opposing teeth.[2, 3, 4, 5, 6, 7, 8, 9] (2) That before the eruption of the deciduous teeth the

Fig. 1-*a*.

Fig. 1-*b*.

Fig. 1-*a* and Fig. 1-*b*.—Alveolar gum pads at birth, showing space between pads in anterior region, through which the tongue protrudes. (Anatomical Museum, Trinity College, Dublin.)

alveolar arches are provided with pads of gum. At birth these pads do not meet in the anterior region as the tip of the tongue lies between the two pads. (Fig. 1 *a*, *b*.) There is not much variation in the anteroposterior relationship of these pads, the lower pad seems to be as far forward as the upper pad, though in one case examined the lower pad was in postnormal relationship, there seems to be no definite occlusion of the segmented gum pads, which have been so graphically described by West.[10] The thickness of the upper lip, anteroposteriorly, gives the appearance of a postnormal relationship of the mandibular alveolar arch. (Fig. 2.) (3) That when the incisors erupt the maxillary incisors overlap the mandibular incisors to a very considerable extent. At two and a half years of age all the deciduous teeth

should have erupted. The teeth in each arch are, in the majority of cases, in approximal contact with one another.

I. DESCRIPTIVE TERMS

The description of occlusal contact adopted here is that suggested by Hellman.[11] It is divided into four groups:

a. Surface contact.

b. Cusp and fossa (or groove or division between two teeth)* contact.

c. Ridge and embrasure contact.

d. Ridge and groove contact.

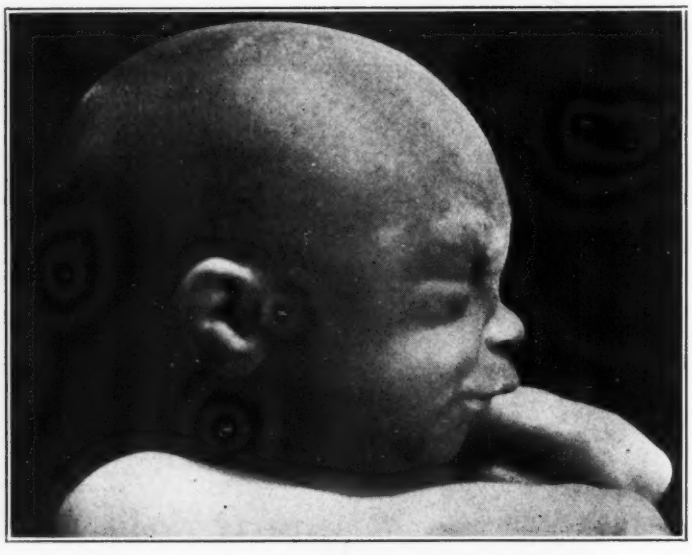

Fig. 2.—Five months' fetus, showing projection of upper lip over lower lip, alveolar pads are in the same vertical plane in anterior region. (Anatomical Museum, Trinity College, Dublin.)

II. THE OCCLUSION OF THE DECIDUOUS TEETH AFTER THEIR COMPLETE ERUPTION

(Figs. 3, 4, 5)

a. *Surface contact.*—The lingual surfaces of the maxillary incisors and canines overlap the labial surfaces of the mandibular incisors and canines and the medial third of the mandibular first molars.

b. *Cusp point contact with a fossa or groove or division between two teeth.*—The lingual cusp of the maxillary molar occludes in the distal or main fossa of the mandibular first molar. (The small distolingual cusp of the maxillary first molar, where present, occludes in the division between the mandibular first and second molars.

The mediolingual cusp of the maxillary second molar occludes in the central fossa of the mandibular second molar.

The distolingual cusp of the maxillary second molar occludes in the distal groove of the mandibular second molar.

The mediobuccal cusp of the mandibular first molar occludes in the division between the maxillary canine and first molar.

*Additional to Hellman's description.

The distobuccal cusp of the mandibular first molar occludes in the central fossa of the maxillary first molar.

The mediobuccal cusp of the mandibular second molar occludes in the medial groove of the maxillary second molar.

The distobuccal cusp of the mandibular second molar occludes in the central fossa of the maxillary second molar.

The distal cusp of the mandibular second molar occludes in the distal groove of the maxillary second molar.

c. *Ridge contact with embrasure.*—The triangular ridge of the distobuccal cusp of the maxillary first molar occludes in the embrasure between the mandibular first and second molars.

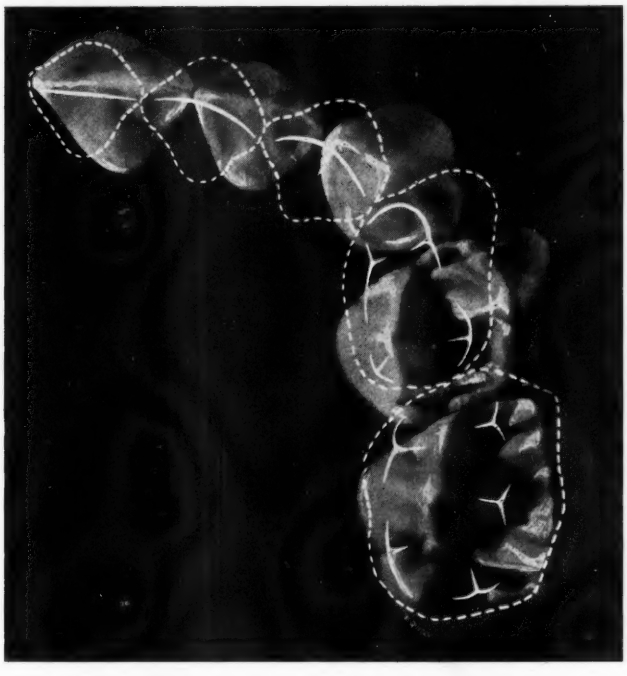

Fig. 3.—Morsal surface of mandibular deciduous teeth, with outlines of opposing teeth, points and ridges of cusps. Three years of age.

(The triangular ridges of the mediolingual cusps of the mandibular molars have no contact with the sides of the embrasures which they oppose.)

d. *Ridge contact with groove.*—The triangular ridge of the mediobuccal cusp of the maxillary first molar occludes in the buccal groove of the mandibular first molar.

The triangular ridge of the mediobuccal cusp of the maxillary second molar occludes in the buccal groove of the mandibular second molar.

The triangular ridge of the distolingual cusp of the mandibular first molar occludes in the lingual groove of the maxillary first molar where the distolingual cusp is present in the maxillary first molar.

The triangular ridge of the distolingual cusp of the mandibular second molar occludes in the lingual groove of the maxillary second molar.

The continuation of the marginal ridge, distally and buccally, of the

mediolingual cusp to join the triangular ridge of the distobuccal cusp together forming the "oblique ridge" of the maxillary second molar occludes in the coronal portion of the distobuccal groove of the mandibular second molar.

III. CHANGES THAT OCCUR IN THE OCCLUSION (A) PREVIOUS TO THE ERUPTION OF THE PERMANENT INCISORS AND FIRST PERMANENT MOLARS, AND (B) AFTER THE LOSS OF THE DECIDUOUS CANINES, FIRST AND SECOND DECIDUOUS MOLARS

There are several conditions affecting the deciduous arches which must be greatly modified before the eruption of the permanent teeth, in order that the latter may assume correct alignment.

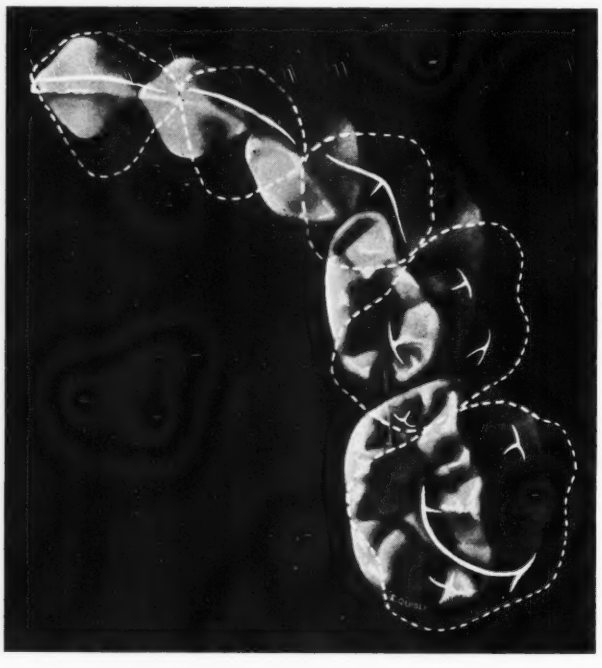

Fig. 4.—Morsal surface of mandibular deciduous teeth, with outlines of opposing teeth, points and ridges of cusps. Three years of age.

a. The difference in the mediodistal diameter of deciduous and permanent incisors.

b. The difference in the mediodistal diameter of the maxillary and mandibular second deciduous molars.

c. The difference in the mediodistal diameter of the deciduous canines and molars and the permanent canines and premolars.

Owing to the very limited number of series of cases at different age periods of which I have models, I have had to depend of necessity on comparative measurments of different cases.

(a) The average difference between the mediodistal diameter of the maxillary deciduous incisors and their permanent successors is equal to 7.6 mm.[6] The difference in the case of the mandibular deciduous incisors and their permanent successors is equal to 6 mm.[6] The maxillary deciduous

dental arch must expand on an average 7.6 mm. to accommodate increased size of permanent incisor teeth. The mandibular deciduous arch must expand 6 mm. to accommodate permanent incisors.

Northcroft[12] has shown that there is a connection between the size of the deciduous teeth and their permanent successors. Large deciduous teeth being succeeded by large permanent teeth and vice versa.

Fig. 5.—Model 271H showing side view of occlusion. Three years of age. (Lent by G. Northcroft.)

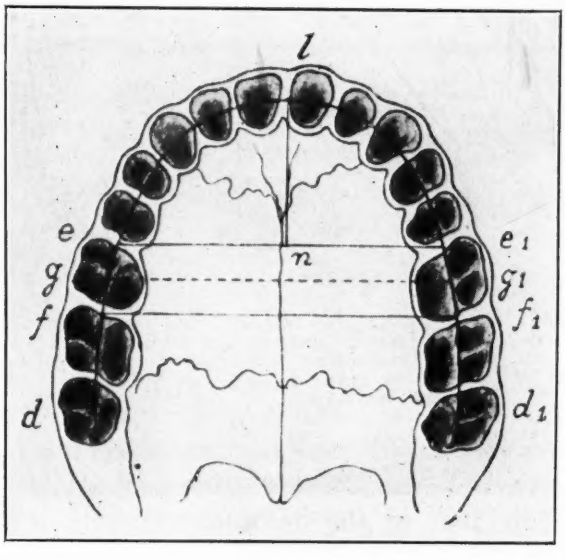

Fig. 6.—Measurements of arch.[13] (After Franke.)

Franke[13] from his examination and measurement of a large number of skulls and models considers that the increase in size of the deciduous dental arch to accommodate the permanent incisors is due to lateral growth of bone instead of growth in an anterior direction. He considers that there is even

an actual loss in the height of the arch* (Fig. 6). Brash[14] supports Franke by means of comparative experimental evidence demonstrating the great lateral growth in the pig's jaw. It is possible that the basis adopted by Franke in measuring the deciduous and permanent alveolar arches is misleading. The deciduous incisor alveoli are very much smaller than the permanent incisor alveoli and though the anterior borders of the deciduous and permanent alveoli may coincide, the midalveolar line of the permanent alveoli will be lingual to the midalveolar line of the deciduous alveoli and would give the appearance of reduced height of arch (Fig. 7). From an orthodontic point of view the incisal two-thirds of the crowns of the incisors and canines

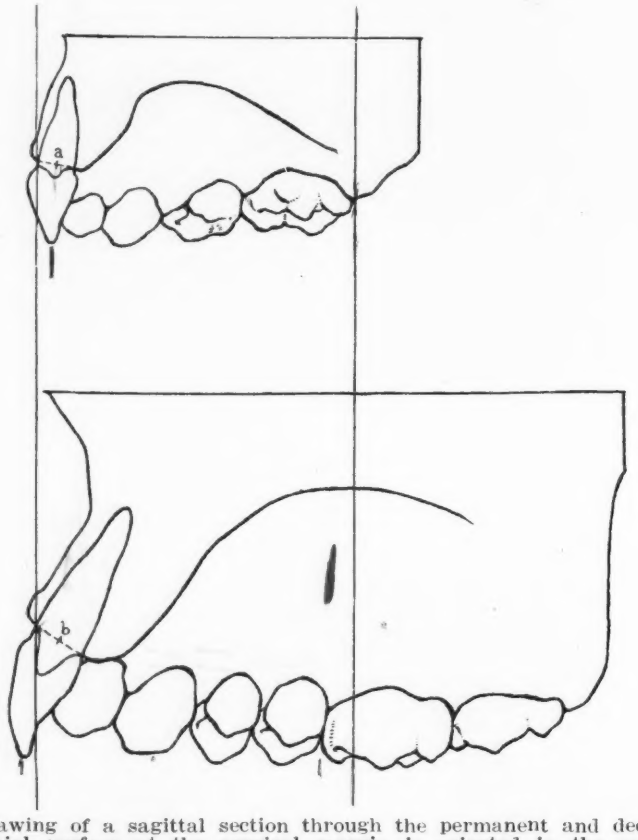

Fig. 7.—Drawing of a sagittal section through the permanent and deciduous maxillary incisors. The labial surface at the cervical margin is oriented in the same plane. Note that the midalveolar point of the permanent incisors, *b*, is more lingual than the midalveolar point of the deciduous incisors, *a*, but that the incisal edge of the permanent incisors is more labial than that of the deciduous incisors.

are of much greater importance than the remaining third of the crown. In addition the inclination of the permanent incisors is labial especially on the lingual surface while that of the deciduous incisors is more vertical. It follows that though the midalveolar line of the permanent series may possibly be lingual to the midalveolar line of the deciduous series, the incisal edges of the permanent incisors are more labial than the incisal edges of the deciduous incisors. The incisal edges of the deciduous incisors are also

*Height of the arch which is defined as the distance of the arch vertex at the point of intersection of the middle of the alveoli of the central incisors from the middle point of the anterior width. (The anterior width being a line passing behind the second deciduous molars or second premolars and intersecting the middle line of the alveolar arch.)

carried in towards the center plane of the teeth, whereas the incisal edges of the permanent incisors are nearer the labial surface.

The dental arch, the projection on a horizontal plane of the incisal edges of the incisors and canines and buccal margins of the morsal surfaces of the pre-

Fig. 8.—Side view of model showing forward growth in mandibular arch. Mark on maxillary second deciduous molar indicates triangular ridge of mediobuccal cusp. Mark on mandibular second deciduaus molar indicates buccal groove. Model No. 68 G. C. school.

Fig. 9.—Side view of Australian skull, No. 504, showing forward growth in mandibular arch. (Anatomical Museum, Trinity College, Dublin.)

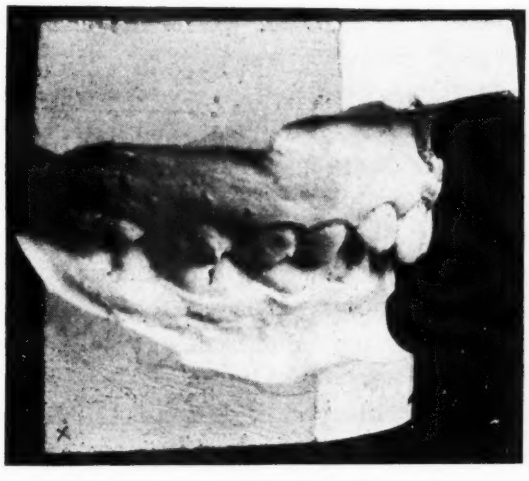

Fig. 10.—Side view of model showing lack of forward growth in mandibular arch. Model No. 6 G. C. school, 1926.

molars and molars,[1] in the deciduous dentition of a child aged three years is very much smaller than in that of a child aged eight years.

It appears to me that the change in size of the dental arch, three to eight years of age, is brought about both by lateral growth of maxillary and mandibular alveolar bone and by the greater inclination of the incisors.

It has been pointed out before that greater growth is necessary to accommodate the maxillary teeth than the mandibular teeth, and one does not find the maxillary arch protruding in any direction over the mandibular arch. The fact that one does not find this protrusion of the maxillary, can only be accounted for by a greater forward growth of the whole mandible in comparison with the forward growth of the whole maxilla (Figs. 8, 9, and 10). That such growth does actually take place is proved by the change in relationship of the maxillary and mandibular deciduous molars and by the edge-to-edge occlusion of the deciduous incisors just previous to their loss. Pitts[15] is of opinion that this edge-to-edge occlusion is not the static relationship of the incisors but the result of wear by forward excursions of the mandibular dental arch. It is, in other words, a position of articulation.[1] He maintains that the mandibular incisors bite behind the maxillary incisors in their true occlusion. That this is not the case would seem to be proved by the fact that definite facets are worn in the molars which would not permit of a more posterior relationship of the mandibular molars in occlusion, and in addition the crowns of the incisors are so worn that for the mandibular incisors to bite behind the maxillary incisors would mean that the former were in postnormal occlusion.

In order that this greater forward growth of the mandible may take place two conditions seem to be essential, first a greater lateral expansion of the maxillary deciduous arch compared with the mandibular arch, so that as the mandible comes forward, the mandibular deciduous canines and molars will not occlude buccally to the maxillary deciduous canines and molars, and secondly an attrition of the cusps and fossae of the teeth sufficient to allow of the mandibular teeth sliding forwards. Wear alone does not seem to bring about this forward growth as has been demonstrated by Lundstrom.[16] The actual forward movement probably never exceeds 1.0 mm. and is usually about 0.5 mm.

(b) Attention has already been drawn to the difference in the mediodistal diameter of the second deciduous molars, the mandibular second deciduous molar being considerably larger than the maxillary second deciduous molar, so that in occlusion the distal surfaces are in the same vertical plane in the majority of cases. If this position were maintained at the time of the eruption of the first permanent molars, these latter teeth would occlude incorrectly. The mandibular first permanent molar would be in distal relationship to the maxillary first permanent molar. The triangular ridge of the mediobuccal cusp of the maxillary first permanent molar would be anterior to the mediobuccal cusp of the mandibular first permanent molar instead of being posterior to it. The greater forward growth of the mandible compared with the maxilla makes it possible for the permanent molars to occlude correctly for this period; i.e., the triangular ridge of the mediobuccal cusp of the maxillary first permanent molar is posterior to the mediobuccal cusp point of the mandibular first permanent molar.

(c) The difference in the mediodistal diameter of the deciduous canines and molars and their permanent successors is on an average 1 mm. in the maxillary arch and 2 mm. in the mandibular arch, so that in both arches too

much room is allowed for the permanent canines and premolars. In five cases the difference between the maxillary deciduous canines, first and second molars and their permanent successors was under 0.4 mm. In these cases the difference in the maxillary teeth was relatively less.

In several series of models of the same children at different ages with normal occlusion it was apparent that the measurement from the medial surface of the first permanent molar to the distal surface of the lateral incisor in the maxillary arch was reduced very slightly after the loss of the deciduous canine, first and second deciduous molars. In the mandibular arch the similar space reduced considerably for the forward drifting of the first permanent molar.[17] This forward drifting of the mandibular first permanent molar brings the triangular ridge of the mediobuccal cusp of the maxillary first molar more definitely into the buccal groove of the mandibular first permanent molar. There is considerable variation in the relative sizes of the maxillary and mandibular second deciduous molars and where the difference of the mediodistal diameter is less, the mandibular first permanent molar will have to drift forward a shorter distance in order to establish the correct occlusion for that period. Indeed cases have been seen where the distal surface of the maxillary second deciduous molar was at an oblique angle to the medial plane of the body and consequently the maxillary first permanent molar was more posterior than is customary at that period.

In the best developed arches of young adults with overlapping incisor bite which I have examined, spaces occurred in the maxillary arch between the lateral incisors and canines or between the canines and first premolars, whereas in the mandibular arch the teeth were in approximal contact. In the cases where the maxillary teeth were all in contact there was a slight crowding of the mandibular incisors, sometimes only to the extent of a slight rotation of a mandibular lateral incisor.

It is important to remember what actually occludes in the buccal groove of the mandibular first permanent molar (Fig. 12). It is not really the mediobuccal cusp point of the maxillary first permanent molar, but the triangular ridge which runs distolingually from the point of the cusp. The angle, which the triangular ridge takes varies to a certain extent, sometimes more distally than lingually or vice versa. The cusp point is usually medial to the part of the triangular ridge that comes in contact with the groove in unworn teeth. On this account many models of young mouths which are casually observed, give the impression that the buccal groove is occluding distal to normal, whereas on closer inspection it is seen that the triangular ridge is in occlusion with the buccal groove.

I find it difficult to reconcile Franke's measurements of the alveolar arch length* of a child of eight years of age being less than the alveolar arch length of a child of three years of age with my observations. The measurements in Table I are Franke's averages and those I made on Mr. Chapman's and Mr. Northcroft's models:

Franke has based his conclusions of the length and height of the alveolar

*Alveolar arch length is the length of the midalveolar line from the intersection of the anterior width.

TABLE I

MAXILLARY ARCH

FRANKE'S AVERAGES				CHAPMAN'S SERIES				NORTHCROFT'S SERIES			
AGE	ANT. WIDTH	HEIGHT	LENGTH	AGE	ANT. WIDTH	HEIGHT	LENGTH	AGE	ANT. WIDTH	HEIGHT	LENGTH
2 to 3 yr.	37.0 mm.	24.6 mm.	69.2 mm.								
4 to 5 yr.	38.9 "	23.6 "	68.6 "	4 yr.*	45.3 mm.	27.7 mm.	78.5 mm.	4 9/12 yr.	40.0 mm.	26.2 mm.	69.5 mm.
6 to 7 yr.	40.3 "	23.1 "	69.4 "	6 6/12 yr.*	45.6 "	26.8 "	78.7 "				
8 to 9 yr.	41.7 "	22.3 "	68.5 "	9 2/12 yr.	47.1 "	28.7 "	82.3 "				
10 to 11 yr.	42.6 "	22.2 "	68.3 "					10 1/12 yr.	41.4 mm.	26.0 mm.	71.4 mm.
20 to 21 yr.	44.6 "	22.7 "	69.1 "	20 yr.	47.5 "	25.1 "	74.5 "				

MANDIBULAR ARCH

2 to 3 yr.	38.9 mm.	21.4 mm.	62.9 mm.								
4 to 5 yr.	40.5 "	21.5 "	63.7 "	4 yr.*	40.0 mm.	25.2 mm.	68.3 mm.	4 9/12 yr.*	35.5 mm.	22.9 mm.	62.5 mm.
6 to 7 yr.	41.0 "	21.5 "	65.7 "	6 6/12 yr.	40.8 "	24.3 "	69.0 "				
8 to 9 yr.	41.3 "	21.3 "	65.8 "	9 2/12 yr.	41.4 "	23.2 "	71.0 "				
10 to 11 yr.	41.8 "	22.6 "	64.0 "					10 1/12 yr.	37.0 mm.	21.5 mm.	62.5 mm.
20 to 21 yr.	43.1 "	18.9 "	60.3 "	20 yr.	42.6 "	19.5 "	61.3 "				

*Deciduous incisors.

arch on measurements from a base line that does not appear to be fixed in its relation to any point during the complete change from the deciduous to the permanent dentition. His base line, a line joining the division between the second deciduous molar and the first permanent molar, is suitable for showing the changes that occur from three years of age to eight years of age; i.e., the change from the deciduous to the permanent incisors: but when he shows that the length and height of the alveolar arch diminishes after the loss of the deciduous canine, first and second molars, he leads one to infer that the arch has been reduced by the anterior teeth falling backwards, when in reality the change is the result of the first permanent molars drifting forwards.

To recapitulate, the changes that occur after the complete eruption of the deciduous teeth and before the complete eruption of the permanent teeth:

1. Slight forward growth of anterior portion of mandibular deciduous arch but mainly lateral growth of whole arch to accommodate permanent mandibular incisors.

2. Slight forward growth of anterior portion of maxillary deciduous arch but mainly lateral growth of whole arch to accommodate permanent maxillary incisors.

3. Forward growth of whole mandibular arch to compensate for greater increase in size of maxillary arch.

4. Labial inclination of permanent incisors, especially the maxillary incisors.

5. Forward movement of mandibular first permanent molar after loss of mandibular second deciduous molar.

6. Slight forward movement of maxillary first permanent molar after loss of maxillary second deciduous molar.

IV. THE OCCLUSION OF THE PERMANENT TEETH OF A YOUNG ADULT

(Figs. 11, 12, 13, 14)

a. *Surface contact.*—The lingual surface of the incisors and canines overlap from one-quarter to one-third of the labial surface of the mandibular incisors and canines and medial half of the first premolars.

b. *Cusp point contact with a fossa or groove or division between two teeth.*—

The lingual cusp of the maxillary first premolar occludes on the buccal side of the distal fossa of the mandibular first premolar.

The lingual cusp of the maxillary second premolar occludes in the distal fossa of the mandibular second premolar.

The mediolingual cusp of the maxillary first molar occludes in the central fossa of the mandibular first molar.

The mediolingual cusp of the maxillary second molar occludes in the central fossa of the mandibular second molar.

The mediolingual cusp of the maxillary third molar occludes on the lingual side of the central fossa of the mandibular third molar.

The distolingual cusp of the maxillary first molar occludes slightly on

Fig. 11.—Morsal surface of maxillary permanent teeth with outlines of opposing teeth, points and ridges of cusps. Young adult.

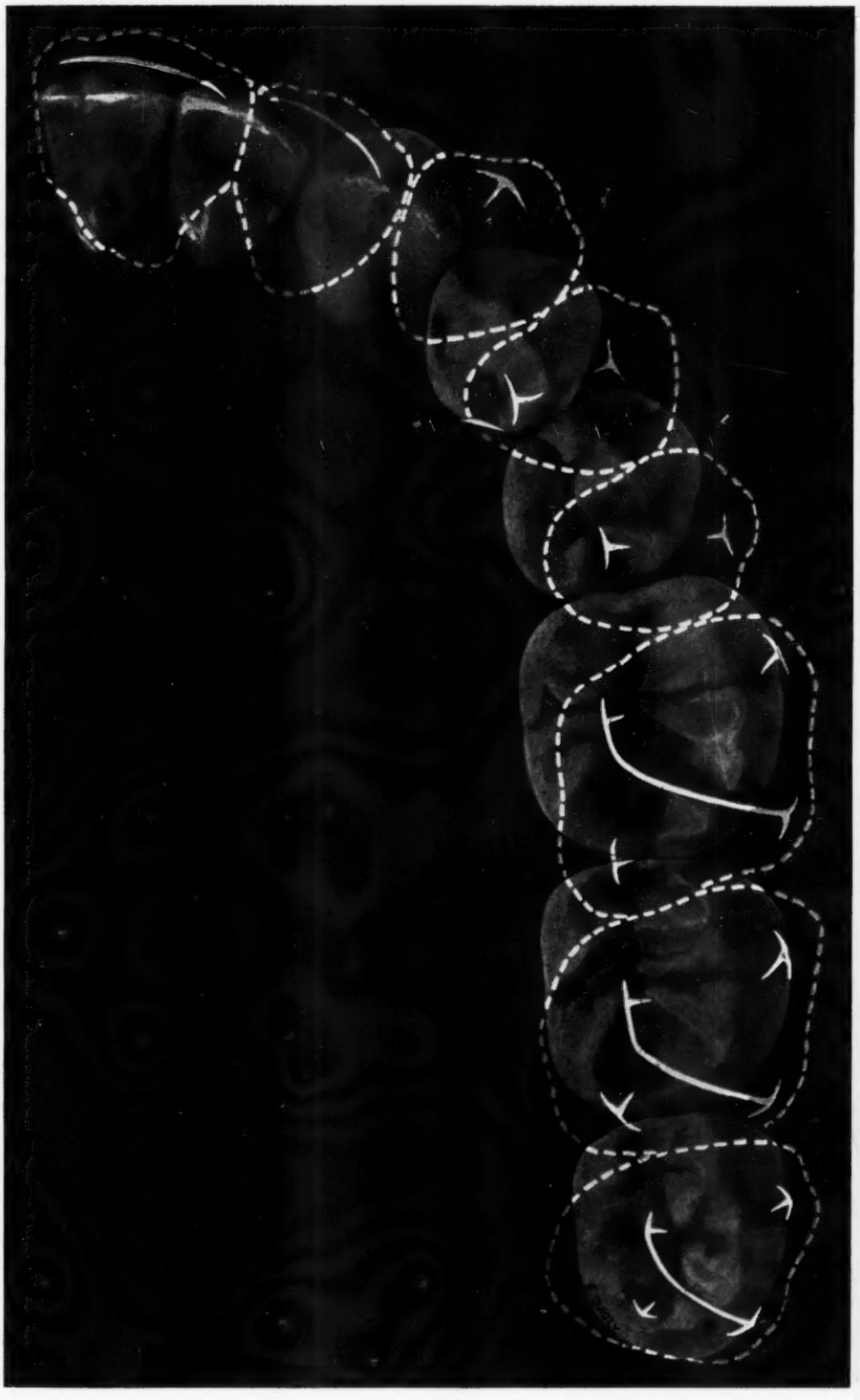

Fig. 12.—Morsal surface of mandibular permanent teeth with outlines of opposing teeth, points, and ridges of cusps. Young adult.

the lingual side of the distal groove of the mandibular first molar and mainly in the medial groove of the mandibular second molar.

The distolingual cusp of the maxillary second molar occludes on the lingual side of the distal groove or fossa of the mandibular second molar.

The distolingual cusp of the maxillary third molar occludes on the lingual side of the distal fossa of the mandibular third molar.

The buccal cusp of the mandibular first premolar occludes in the division between the maxillary canine and first premolar.

The buccal cusp of the mandibular second premolar occludes in the division between the maxillary first and second premolars; point of cusp is in medial groove of maxillary second premolar.

The mediobuccal cusp of the mandibular first molar occludes in the division between the maxillary second premolar and first molar.

The mediobuccal cusp of the mandibular second molar occludes in the

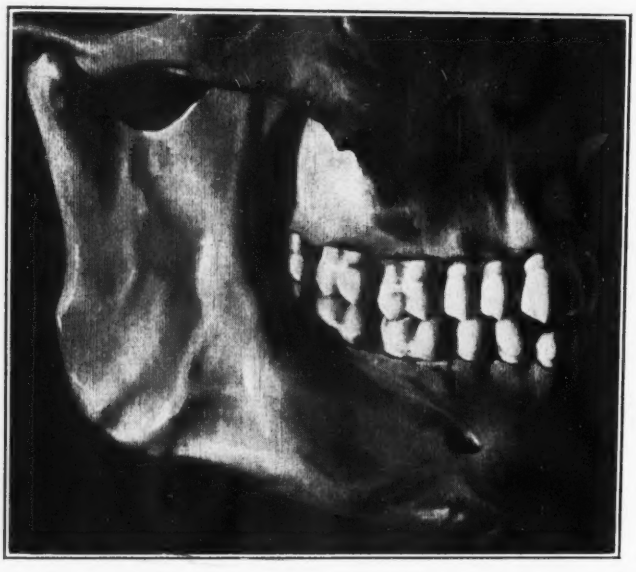

Fig. 13.—Side view of European skull of a young adult. This drawing has been modified from skull No. Br. 15, Anatomical Museum, Trinity College, Dublin. In this skull the third molars were not fully erupted and the maxillary canine had been lost during the preparation of the specimen.

division between the maxillary first and second molars, or in the medial groove of the maxillary second molar.

The mediobuccal cusp of the mandibular third molar occludes in the medial groove or supplemental medial fossa of the maxillary third molar.

The distobuccal cusp of the mandibular first molar occludes in the buccal side of the central fossa of the maxillary first molar.

The distobuccal cusp of the mandibular second molar occludes on the distal side of the central fossa of the maxillary second molar.

The distobuccal cusp of the mandibular third molar occludes on the distal and lingual side of the central fossa of the maxillary third molar.

The distal cusp of the mandibular first molar occludes on the medial side of the distal fossa of the maxillary first molar.

The distal cusp of the mandibular second molar when present occludes in the distal fossa of the maxillary second molar.

The distal cusp of the mandibular third molar when present occludes on the medial side of the distal fossa of the maxillary third molar.

c. *Ridge Contact with Embrasure.—*

The triangular ridge of the buccal cusp of the maxillary first premolar occludes in the embrasure between the mandibular first and second premolars; the triangular ridge is slightly medial to the apex of the embrasure.

The triangular ridge of the buccal cusp of the maxillary second premolar occludes in the embrasure between the mandibular second premolar and first molar; the triangular ridge is medial to apex of embrasure.

The triangular ridge of the distobuccal cusp of the maxillary second molar occludes in the embrasure between the mandibular second and third molars, where the mandibular second molar is a four cusped tooth; usually the triangular ridge is slightly medial to apex of embrasure, so that there is

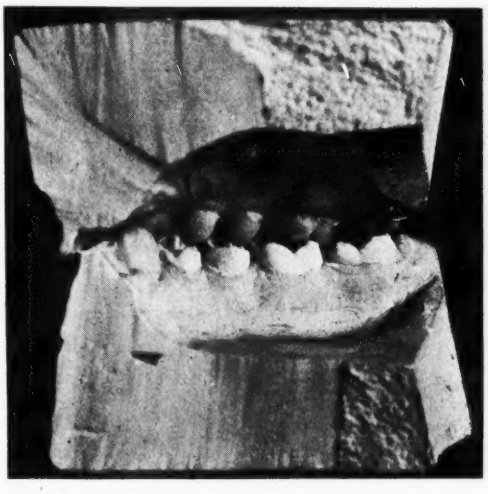

Fig. 14.—Model showing lingual view of occlusion in a boy aged sixteen years.

little or no contact with the medialbuccal surface of the mediobuccal cusp of the mandibular third molar.

The triangular ridge of the mediolingual cusp of the mandibular second molar occludes in the embrasure between the maxillary first and second molars; the triangular ridge is slightly distal to apex of embrasure.

The triangular ridge of the mediolingual cusp of the mandibular third molar occludes in the embrasure between the maxillary second and third molars; the triangular ridge is distal to apex of embrasure.*

d. *Ridge Contact with Groove.—*

The triangular ridge of the mediobuccal cusp of the maxillary first molar occludes in the buccal groove of the mandibular first molar. The triangular ridge slopes distolingually from the point of the cusp so that the cusp point is slightly medial to the buccal groove at this period.

The triangular ridge of the mediobuccal cusp of the maxillary second

*The triangular ridges of the lingual cusps of the mandibular first and second premolars and usually the midiolingual cusp of the mandibular first molar have no contact with the sides of the embrasure which they oppose.

molar occludes in the buccal groove of the mandibular second molar. The point of the cusp in unworn teeth is medial to buccal groove, the triangular ridge running distolingually.

The triangular ridge of the mediobuccal cusp of the maxillary third molar occludes in the buccal groove of the mandibular third molar.

The triangular ridge of the distobuccal cusp of the maxillary first molar occludes in the distobuccal groove of the mandibular first molar no contact with mediobuccal cusp of mandibular second molar in unworn teeth.

The triangular ridge of the distobuccal cusp of the maxillary second by adequate function. a similar condition occurs in the adult as the result molar occludes in the distobuccal groove of the mandibular second molar, where the mandibular second molar is a five-cusped tooth.

The triangular ridge of the distobuccal cusp of the maxillary third molar occludes in the distobuccal groove of the mandibular third molar, where the mandibular third molar is a five-cusped tooth.

The continuation of the marginal ridge distobuccally of the mediolingual cusp to join the triangular ridge of the distobuccal cusp of the maxillary first molar, the oblique ridge, occludes in the caronal portion of the distobuccal groove of the first molar.

The oblique ridge of the maxillary second molar occludes in the distal groove and distotriangular groove of the distobuccal cusp of the mandibular second molar, where the mandibular second molar is a four-cusped tooth. (Where the mandibular second molar is a five-cusped tooth, the oblique ridge occludes in the coronal portion of the distobuccal groove.)

The oblique ridge of the maxillary third molar occludes in the coronal portion of the distobuccal groove of the mandibular third molar; where the mandibular third molar is a five-cusped tooth. (Where the mandibular third molar is a four-cusped tooth, the oblique ridge occludes in the distal groove and distotriangular groove of the distobuccal cusp of the mandibular third molar.)

The triangular ridge of the distolingual cusp of the mandibular first molar occludes in the lingual portion of the distolingual groove of the maxillary first molar.

The triangular ridge of the distolingual cusp of the mandibular second molar occludes in the lingual portion of the distolingual groove of the maxillary second molar.

The triangular ridge of the distolingual cusp of the mandibular third molar occludes in the lingual portion of the distolingual groove of the maxillary third molar.

V. THE CHANGES THAT OCCUR IN THE ADULT OCCLUSION AS THE RESULT OF WEAR

The deciduous maxillary incisors overlap the mandibular incisors at two and a half years of age, but this overlap disappears, the incisors ultimately meeting edge to edge. This edge-to-edge occlusion can only develop where there is the stimulus to forward development of the mandible accompanied by adequate function. A similar condition occurs in the adult as the result

of wear only. The cusps of premolars and molars are worn away and consequently the jaws come more closely together; this mechanically swings the jaw further forward, so that the mandibular incisors wear more heavily on the maxillary incisors and the edges are worn away. The greater the wear of the molars the more the edge-to-edge occlusion of the incisors. (Fig. 15.)

In the majority of ancient European skulls of adults and even of adolescents, the coarse nature of the food eaten has worn the molar teeth and reduced the occlusion of the incisors to an edge-to-edge form. That this edge-to-edge occlusion of the incisors was not originally present in these cases can be demonstrated by the relation of the molars and premolars. The mandibular premolars and molars are more forward in their relation to the maxillary teeth than is the case with unworn teeth. The points of the buccal cusps of the maxillary premolars are opposite the apex of the embrasure

Fig. 15.—Side view of Australian skull No. 441. The teeth are extensively worn. Note the forward relation of the mandibular teeth to the maxillary teeth, compared to Fig. 13. (Anatomical Museum, Trinity College, Dublin.)

which they oppose. The distobuccal cusps of the maxillary first and second permanent molars come in contact with the mediobuccal cusp of the mandibular second and third molars. The lingual cusps of the maxillary premolars show an inclination to occlude between their corresponding opposing tooth and the tooth distal to it.

Recently a large number of Saxon skulls have been discovered at Bidford-on-Avon by Mr. Humphreys.[18] The majority are those of adults with worn teeth and edge-to-edge incisor bite. In one case the skull is of a child about eight years old and there is a distinct overlap of the incisors; the significance of which I wish to emphasize. Sir Arthur Keith[19] considers that the change in diet of modern man is responsible for the prevalent overlapping bite of the incisors. He maintains that it is want of use of the masseter and internal pterygoid which causes the lack of development of bone. This may be so, though I should have thought the external pterygoid of more importance. It should be borne in mind, however, that the cases of marked over-

bite of the permanent incisors in modern children have been previously apparent in the deciduous occlusion and that the want of wear of the deciduous teeth, due to lack of function and muscular inefficiency must be primarily responsible for the condition of the adult. I feel quite convinced that a slight overlap was the normal occlusion of ancient man and that the edge-to-edge occlusion is the result of wear.*

The description that I have given you is an hypothesis of what I believe is the ideal state, based on the examination of a large number of specimens. It is the groundwork for every orthodontic student. I wish you to realize that the really important aspect of occlusion is its functional capacity, whatever that function may be. Appearance, mastication, respiration or the enunciation of words; and so far as I can see each one of us must determine functional occlusion for ourselves. Each year it becomes clearer as our knowledge of function increases, but I do not think at present any hard and fast rule can be laid down differentiating functional from nonfunctional occlusion.

I am indebted for the material for this investigation to the Anatomical Museum, Trinity College, Dublin; the Hunterian Museum, Royal College of Surgeons, England; eight models of adult normal occlusion from Dr. Coegergh's of Utrecht Collection (published in Transactions of the European Orthodontic Society, April, 1912); series of models lent by Mr. G. Northcroft and Mr. H. Chapman, London; details of the occlusion of eight models from Dr. LeRoy Johnson's collection.

My own series of models were obtained from two orphanages during the last four years.

I should like to thank Mr. and Mrs. Robert Lindsay for the use of their translation of Franke's book, and to them and Messrs. Northcroft, Chapman and McKeag for their most helpful advice and criticism. I should also wish to thank Dr. C. M. West for his preparation of the specimen (Fig. 1, *a*, *b*).

The drawings, Figs. 3, 4, 11, 12, and 13, are the work of Miss Ethel Quigly.

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DISCUSSION

A. LeRoy Johnson.—This is a difficult paper to discuss, it is a valuable and timely contribution to orthodontics. He has presented an analytic study of occlusal conditions, drawing his data from the observation of actual specimens and a survey of the records of other writers upon this subject. So far as I am able to determine, his conclusions should be accepted. In fact I believe that he has given us the most painstaking composite of occlusal relations that we have to date.

He has directed our attention to certain tooth relations which are important and which few have recognized. Moreover, he has emphasized the fact, by the exhibition of evidence, that occlusal phenomena "obey the general biologic principle of continuous change" with age. The recognition of this truth is not merely of academic interest; it is essential knowledge in practice. For years we have accepted what we believed to be the ideal scheme of occlusion of the young adult as our standard, applying it to young and old alike. Now, Dr. Friel has shown us that we have considered as atypical, occlusal conditions that were typical for a certain period of development. Also that we have endeavored to create conditions in young patients, in children, which are natural only to the adult. He has shown that the typical relations of the first permanent molars are not identical at six, sixteen, and sixty years of age. Occlusal phenomena are changing from childhood to old age; they typify function, and function signifies all the dynamic processes of living tissues. Occlusal phenomena reflect the vital processes of the supporting structures of the teeth. Thus in the study of occlusion the time element is as vital a factor as it is in the study of the vascular system, the joints or the glands. There is a difference only in degree.

The essayist has enumerated four periods in the evolution of occlusion, at the same time indicating the changes which characterize these periods. That which he designates as the *second period* is one we should give serious thought to. "The changes that occur in the occlusion previous to the eruption of the permanent incisors and first permanent molars, and the changes which follow the loss of the deciduous canines and the first and second deciduous molars" is a period of great importance. Unless we interpret the changes taking place at this time in their true light we are liable to err in diagnosis. This exposition which has been given us of the changes which take place in the ideal is the background of our diagnosis; it is not merely a subject of academic discussion. How often it has happened in the past that crowded permanent mandibular incisors have been straightened by moving them forward when the room they need is being held by the deciduous molars. To those who would begin the treatment of all cases between the ages of five and seven or eight years of age, the changes referred to by Dr. Friel as taking place during this second period are particularly significant.

From the material that has been presented certain general principles can be derived relative to the changes in tooth relations under ideal conditions. A knowledge of such principles is important. But upon such knowledge alone we cannot base our diagnosis. The problem of malocclusion in children is one of development of supporting structures; hence diagnosis is not merely a question of the mechanics of tooth relations. From a recent textbook on histology I quote the following: "The proper contact of the teeth upon their proximal surfaces is necessary for this development. If, for instance, the mesial angle of the mandibular lateral fails to engage the distal surface of the central, but slips by to the lingual, the growth of the canine will push it farther and farther past the central instead of enlarging the arch. One of the cogs in the mechanism has slipped, and the growth of the bone cannot later be expected to make room for the crowded teeth." (Noyes, p. 363.) Now that this is not true to the extent implied is obvious to any one who will watch the development of a large number of children's dentures over a period of years. Holt has called the

attention of the medical profession to the inherent tendency of living organisms to evolve typal forms during periods of development, and there is a large amount of material available today showing that this inherent tendency finds expression in the human denture as well as in other parts of the body.

Thus when changes during this second period in the development of the denture do not conform in every detail to the principles laid down by Dr. Friel, it does not necessarily mean that conditions are abnormal needing treatment. To determine this involves a broader problem. Yet it is by virtue of our knowledge of the ideal in tooth relations that we are able to recognize variations which may be abnormal. Building on the pioneer work of Hellman, Dr. Friel has given us a background for the recognition of variations in occlusion from the time of the completion of the deciduous denture to old age. The material of this contribution should be used in teaching the fundamentals of occlusion in all educational institutions.

Dr. W. Stanley Wilkinson, Melbourne, Australia.—I would like to add one or two observations to a period of Dr. Friel's paper which deals with that up to six months of age. Dr. Friel stated that the gum pads of the newborn infant were in apposition. Later in the paper he spoke distinctly upon several occasions of the forward growth of the mandible.

My observations lead me to believe that at birth the gum pad of the mandible is posterior to that of the maxilla. I had the opportunity some five years ago of taking impressions of the jaws of a child of seven days old. Six months later impressions were again taken and when measurements were taken of the alveolar ridge, it was distinctly observable that there had been a considerable discrepancy in the length of the alveolar arches of the mandible over those of the maxilla.

Some eighteen months later another opportunity presented itself of taking similar impressions and these bore out the same results as had been observed on the initial ones; that is to say, during the first six months of life the forward growth of the lateral halves of the mandible was considerably greater than that of the lateral halves of the maxilla.

It is a matter of clinical observation to all of us that newly born cases stimulate from the same class, division one case, and so forth.

It was Weinberger who showed that the fetal position necessitated a growth of mandible. Dr. Friel suggests that the prominent lip in the infant gives that appearance. I think the case he showed was that of an incipient mouthbreather. Many children are such when they are born, and those familiar with a work published by Catlin many years ago know that it has long been the custom of the Indian mothers to persistently close the lips of newborn infants in order to counteract the habit of mouthbreathing.

I had the opportunity of examining the children in two foundling hospitals and was surprised to find that 95 per cent of them, between the ages of one or two weeks and two years had at some time or other had the thumbs placed in their mouths by the nurses in order to pacify them, and it seems to me that this thumbsucking, even if indulged in to a slight degree during the first six months, has a direct inhibiting action upon the normal forward growth of the mandible.

During the first six months of life we should get a much accelerated growth of the mandible as opposed to that of the maxilla.

That is one observation to a paper I have appreciated very much and which I think is very valuable.

Dr. George W. Grieve, Toronto.—I should like to compliment Dr. Friel and also compliment the splendid way in which he abbreviated the paper and did not spoil the continuity of it.

A very important point brought out—and this discussion will also apply to the previous paper, I believe—in discussing it from the mechanical viewpoint, that many of our cases are the result of overbite, of which Dr. Friel spoke. Where we have that excessive overbite, if wear does not take place which he spoke of, we are well advised in taking those cases under treatment and intrude the incisors in order to stimulate forward growth of the mandible.

Dr. Friel.—I have very little to add except to thank Dr. Johnson who was well grounded on what he was to say.

With regard to Dr. Wilkinson's question on newborn children, fifteen cases were examined and out of those twelve showed the alveolar pads at the same plane antroposteriorally. One case was undoubtedly postnormal; the mandibular was distal to the maxillary, and in the other two cases it was very doubtful, as there was great difficulty in examining the child.

I certainly congratulate Dr. Wilkinson on having the pluck to take an impression of a seven day old child.

The third slide I showed was a fetus of five months and I don't know whether you could have a tendency to mouthbreathing of a fetus of five months. I don't think so.

ENDOCRINODONTIA

Lectures Read Before the Dewey Study Club

By Dr. David M. Kaplan, New York City

Lecture V

WRITING articles on endocrinology does not make one proficient in this medical endeavor. The crucial test is applied at the bedside. Here, and nowhere else, are the doctor's qualifications determined. He is a vendor of health—a *Therapos*. We are as yet on the first rung of the endocrine ladder, and as all of us are anxious to climb, we may slip, in our haste, and thus expose ourselves to ridicule from the professional critic and tyro. Make haste slowly, and bear in mind the adage, "Per ardua ad sidero," and learn to discriminate between the real and the apparent in endocrine phenomena.

There are rheumatic and cardiac symptoms obtained in the thyrotrope, and appendical syndromes in the pituitotrope, which upon careful analysis are brought to the surface by a tonsillopathy. That the future will disclose a humoral relationship between the tonsil and the other endocrines, in health and disease, is to me no chimerical notion. At the present time there is a relentless crusade against this gland, and as safe and sane endocrinologists, we, at least, should take a more charitable stand toward this friendless member of our body.

You will remember that the removal of the thyroid produces a definite clinical picture, known as cachexia strumipriva, which develops in a comparatively short time after the surgical interference. Were the numerous and indiscriminate removals of the tonsils followed by a cachexia tonsillopriva the crusade against the tonsil would die a natural death. Alas, the tonsillopriva patient shows inconveniences too remote to impress the professional and lay public. We need an Abel, a Kendall, or a Banting to show us, black on white, that the tonsils possess a something that the body needs. I do not take the stand that no tonsils at any time should be removed. There are distinct indications where the surgeon's aid is imperative, but when I admit this, I also bear in mind tonsillar states which could return to normal by proper medical means.

The tropism of the growing child demands aid from its endocrine equipment, and calls on every depot for help. And it seems to me that the child or young adult goes to the tonsil for something. The tonsil thereupon hypertrophies, and causes a general posterior nasal and pharyngeal adenoid hyperplasia. Give the child a chance to outgrow its formative period, and these lymphatic structures will return to normal without any help. Too many mothers are anxious about their offspring who sleep with their mouths open and snore. "O wad some power the giftie gi' us, to *hear* oursel's as ithers *hear* us!"

Much more could be adduced in defense of the tonsils, but the "police verso" of the throat specialist, serving in the capacity of a self-appointed judge and jury, refuses to listen to conservatism, and the poor tonsils are guillotined. I could spend the entire evening in defense of this gland, but I must engage your attention towards the adrenals, in order to cover as much as possible this most important endocrine.

There are clinical states as remote from direct suprarenal dysfunction as an earache is from a diseased tooth, nevertheless, earaches have been cured by the dentist, who corrected the dental pathology, and some remote clinical inconveniences have been entirely removed by a proper display of suprarenal extract.

Of all endocrines that suffer from disease, the adrenals are most concerned in carrying the burden. Just fix in your minds of what importance energy in general is to life, and you will be able to gauge the rôle that this dynamo plays in the healthy and diseased body. Every muscular act which depends upon sympathetic nerve fibers for its execution must receive its continuous sparks from this generator of energy. No spark, no contraction, no suprarenal secretion, no muscular work, no life.

If one only takes into consideration the contraction of the blood vessels in the brain and the consequent brain fag resulting from an anemia, due to improper cerebral blood supply, following the lessened contraction, you can figure out what the consequences would be if the heart is similarly affected. And there are diseases which seem to select the adrenals as their battlefields, and foremost among them is influenza. There are also drugs which have a tendency to cripple these glands, and chief among them is aspirin. To tell how often the recognition of these two factors helped my patients would require a volume in itself. I will not burden you with such detail, but shall point out the mechanism, which, though cryptic and mysterious on the surface, nevertheless, properly elucidated, will open your eyes to possibilities little short of the astonishing.

Anything that tends to deplete these glands, and impoverish the system, adrenally speaking, is at once registered in so many ways, and at times so remote from the accepted territory of adrenal work that the average doctor is to be pardoned indeed if he does not at once recognize his patient's real trouble, and of course does not treat him correctly.

It matters little to me what muscular, cardiac, intestinal, or cerebral stimulant is used, I always use suprarenal extract as the most natural and dependable constrictor of muscles anywhere. Some inconveniences may be due to lack of contraction, others again may be due to reflex secretory influence. Of such a case I shall give you to start with the symptomatology, endocrine analysis, and treatment. Before entering upon this analysis, I want to impress upon your memory the appanage of adrenotropism: First and foremost, energy; second, masculine decoration. It is important for you to remember these tropic appanages, for they are the most significant masculine determinants, just as the pituitary-tropisms are the most important feminine trends.

Mr. T., twenty-nine, single, pharmacist, fourth child of six, diphtheria at

four, capable of doing hard work for long hours, complained of pain in right inguinal region, and poor digestion for six years. Had terrible heartburn after meals, which came on about one-half hour after eating and caused great discomfort for about two hours. Used to take bicarbonate of soda and magnesia usta regularly, but had only temporary relief. At times pain was so great that he could not attend to business. Later he suffered from occipital headaches of a throbbing nature. He had been constipated for the last four years. At times he had a pain in his anus from a small hemorrhoid which bled occasionally. When the hemorrhoid bled he felt better. He lost twenty-two pounds in one year.

Laboratory Findings.—

Urine.—Normal.
Blood.—Normal.
Gastric Contents.—104 total acidity.
82 Free HCl.

Feces.—Normal. 2½ c.c. gas in twenty-four hours' incubation.

Physical examination showed a man five feet six inches in height, with a sallow complexion, dark, bright eyes, eyebrows that met over the bridge of the nose, raven black hair, abundant over the head, with an implant of hair low over the forehead. He found it necessary to shave each day. Teeth showed yellow spots on grinding surfaces, molars intact, canines sharp and long. No pathologic spacing. Tongue large and bright colored, the mucous membranes normal. There was a large amount of long, black hair over his entire chest. On his back were three small and one pea-sized brown birth marks. Vasomotor reaction was first white, then a diffuse red with a white center. It was slow in appearing (fifty seconds); then disappeared in five minutes. Reflexes were normal, although lively. Heart sounds showed normal ostia and a vigorous musculature with accentuation of the second aortic sound; there was no enlargement. The abdominal contents showed no abnormality except a slight tenderness at the xiphoid. The abdomen was covered with an abundance of dark hair. In the inguinal region on the right side could be felt when he coughed a distinct impulse against the examining finger. The left testicle was two inches lower than the right. The legs and arms showed an abundant hairy growth and a few discrete pigment deposits, and were normal in so far as structure and function were concerned.

The futility of the so-called standard drugs used for such a well-defined condition brought about a mental status bordering on despondency. Being a pharmacist and having a large acquaintance among physicians, he gradually lost confidence, so that when he presented himself to me it was a difficult task to make him enter into an agreement to help along his cause. He was told to take one small dose of suprarenal (one-fourth grain) and present himself a week later, keeping close observation on anything that might happen in the meantime. He returned with an evident expression of satisfaction and related the following:

After taking the tablet of suprarenal he felt a sensation of warmth in

his epigastrium, and a slight feeling of tightness in his head. The food eaten that day gave him no distress, a condition not experienced for years. The following three days were also free from distress after eating, but on the fourth the trouble returned, although in a much less violent form. His physical condition, particularly the vasomotor response, was unchanged; he was given one quarter grain of suprarenal every second day and told to report in two weeks. The following visit showed an entire absence of gastrointestinal trouble; no pain, regular bowel movements, and no throbbing headaches. The second aortic sound was accentuated. The vasomotor reaction was first pink (appearing in ten seconds), then spread, assuming a white diffuse border,

Fig. 9.

then faded away in fifteen minutes. He was advised to take only one tablet a week and keep note as to his condition. A month later he was entirely free from all complaints, and for the past five years had not taken any drugs, including suprarenal extract.

Before going much further, permit me to enlighten your endocrine conceptions with an experiment apropos of this case. A four-foot cage, divided into two compartments by means of a glass partition. The glass partition has an ordinary window shade hiding one-half of the cage from the other. A rabbit in one part, and a rattlesnake in the other. The suprarenal content in the rabbit's blood and the acidity of its gastric juice had been repeatedly determined before the experiment. Let us say, for diagrammatic purposes, that the adrenal content was 50, and the same held for the gastric juice.

The rabbit in the cage knew nothing of its ghastly neighbor. The blind was suddenly raised, and the unsuspecting rabbit was brought face to face with the snake. Struck with terror, almost paralyzed with fear, the rabbit was removed from the cage and its adrenal content determined. It was found that the former fell to 10, and the latter rose to 100, diagrammatically speaking. Can you, from this experiment, reconcile the hard work of my patient with his hyperacidity? His labor depleted his adrenal secretion, and consequently increased his hydrochloric content, and he was cured with normal suprarenal extract, given by mouth.

Any exertion, mental or physical, calls upon the adrenals for support, and if the efforts are sufficiently intense or prolonged, you will most likely suffer later from heart burns. In the ordinary, well-balanced endocrine household, these inconveniences disappear without help, in a short time. It is otherwise, however, in the adrenotrope. He carries the stamp for a long period, until his inconvenience is endocrinally corrected.

The philosophy of endocrine interpretation, aside from its therapeutic possibilities, opens a vista to the thinker which makes him wonder at the wisdom of the Maker. You remember the tropism of the pituitary—bulk and rhythm—and that this gland is a female determinant. Bulk, expressed in physics, is nothing more than matter. Now, if you will think of the adrenals as appanages of masculinity, and of energy in general, you will, philosophically speaking, reconstruct the entire universe on an endocrine conception of force and matter.

And life is nothing more or less than an harmonious interaction between these two factors. Energy without matter is a dumb, aimless power, and matter without energy is dead, and eternally *in statu quo*. Applied to the human organism, we have X numbers of applications of force to the static entities of our bodies. Energy expended upon muscles and ligaments gives us tone and elasticity, a diminished quota of adrenal secretion gives the atonic musculature and inelastic, stretched ligaments.

The woman who undergoes an Alexander operation, which consists of shortening the ligaments which suspend the uterus in a normal position, should first have an endocrine therapy, and only when this fails, then call in the surgeon to take in some of these stretched uterine suspenders. The ligaments in such a person are inelastic, and like old rubber, lose their power to sustain weight. It is quite apropos, in this connection, to think of your fallen arches, pendulent abdomen, sagging intestines, varicose veins, and as in the cited case, an impending hernia.

It is because of the adrenal lethargy that blue babies came to the world as a result of twilight sleep, and its requiem was sung soon after its introduction into obstetrics. It must be pointed out to you that besides a pressor principle the adrenals also furnish an oxydase to the red blood cells, which must have it in order to attach the oxygen in the pulmonary alveoli to its hemoglobin, thus changing it into oxyhemoglobin.

The adrenal appanages are:

THE TROPISMS OF OVERACTION

Increased arterial tension—often premature.
Hirsutes (beards and mustaches in the female).
Lean but hard muscles.
Long, sharp canines.
Eyebrows thick, bushy, meeting in the center.
Glycosuria (adrenal).
Dusky—or olive complexion. Psoriasis.
In women, hypertrophy of the clitoris, with pubic hair having the apex pointing towards the umbilicus.
Harsh, masculine voice.
Violent outbursts.
Aggressive personality.
Easily endure fatigue.
Little affected by sustained hard labor.
Affectivity (in the female may reach sexual inversion).
The sexual instinct deviates, becomes violent, actively a precursor of sadism.
Mental crises with vasomotor phenomena.

THE TROPISMS OF UNDERACTION

Arterial hypotension (adrenal Basedow).
Black and blue spots on legs and arms.
Melanoderma and melanoblasts.
Injuries bleed a long time.
Sargent line white, or slightly pinkish.
Ligaments stretched, and affected points painful.
Muscles flabby—amyotrophic.
Hyperacidity.
Asthenia—easily fatigued.
Asthma.
Lumbar pains.
Sadness.
Micawber complex (putting things off until tomorrow, or waiting for something to turn up).
A yielding personality—the underdog.
Sexual impotence in male; lack of sexual appetite in female.

Adrenal secretion is so important that nature provided many caches of adrenal-like cells in the skin. In time of need, these cell-depots become enlarged, and may be seen with the naked eye. They are the little moles or birth marks, or as I have elsewhere designated them, melanoblasts. Dr. Abel isolated from similar skin deposits of the Buffo Aqua, a South American frog, a pressor principle analogous to adrenalin.

Without being in the least changed pathologically there are some individuals who are dominated by their adrenals, and such is the adrenotrope. One of the signs of adrenotropism is a pigmented skin. In Addison's disease, where the entire adrenal appanage is crippled, these skin deposits are very

numerous, involving even the mucous membrane. It is not a far-fetched notion to assign to these melanoblasts a vicarious adrenal function, to supplement and help the ones in the abdomen. It is well to remember that chromotrophic cells, no matter where they are located, all yield adrenalin and are all closely related to the sympathetic nervous system. Whereas these dark deposits in the skin are compatible with perfect health, they nevertheless point to the link in the chain of human function which must be spared during duress. Diphtheria toxin being a direct poison to the smooth muscles in the body, we must take timely precautions in children affected with diphtheria, the more so when they show melanoblasts in their skin. Such children should be kept at rest for a long time, and their suprarenal glands should be supplemented by small doses of the extract once or twice daily. You can absolutely do no harm, but may thereby save a life. The same relationship on an endocrinotropic basis that measles bears to the thyrotrope and scarlet fever to the pituitotrope, diphtheria bears to the adrenotrope. Diphtheria and the adrenotrope individual are respectively the two parties entering into the contract resulting in the clinical picture of the disease.

In advising strict rest in adrenotrope patients, I would advise the repeated daily test of determining the Sargent line, which consists in gently scratching the skin over the upper part of the sternum, and note the color. If it remain white, rest is still imperative. Should it turn pink, then your patient may be permitted to move about gently, for not more than fifteen minutes to begin with. With diphtheria we cannot afford to be careless. The other extreme of overcautiousness is much safer. When the pink line appears quickly and lasts for ten to fifteen minutes, your patient is quite out of danger, and may be permitted to go about.

Another large class of people take upon themselves the onus of prescribing the well-advertised coal tar drug, aspirin. I mentioned before that this substance is decidely injurious to the adrenals. It is a combination of salicylic acid and acetic acid. In my mind the heart burns produced are not so much caused by the acid radicles as by the hypoadrenia following the use of aspirin. The fatalities of the grippe epidemic of 1918 would have been by far less appalling had not the public been accustomed to swallow aspirin inadvisedly. Grippe, in itself an adrenal poison, together with aspirin, proved too much for the patients' adrenals, and death was the result. Only those whose adrenals overwork will be able to tolerate with a certain degree of impunity and immunity the constant recourse to the benumbing effects of this drug; for it must be conceded that many headaches and neuralgias are ameliorated by its intake—but then I ask, "At what price?"

Vigor, energy, and perseverance are adrenal appanages and those who are endowed with an abundance of adrenal secretion show the tropic indices of such an equipment. Their canines are long and pointed, and their bodies are hairy. They are the world's fighters and pioneers. If the possessor of such an endocrine endowment happens to be a female, unless the condition has reached a pathologic stage, she will be a leader among women and men. This describes the adrenotrope who is well balanced. Should there be a dysbalance, then we encounter the crank in the school, the prude of the

parlor, and the old-maiden aunt of the household. They want to be officious, but somehow everyone takes their activities as a joke. They mimic men in their traits, attire and mode of procedure. This state of affairs may be adrenotropic primarily, or it may be secondary to a marked gonadopathy. In the latter instance there will be found a peculiarity in the upper laterals, the canines remaining normal. Such a case you will find in the photograph, but for the present all I want you to note is the general masculinity of the woman, and particularly her hands. She will be dealt with more fully in my next lecture. To give you a philosophic insight into the almost canine canines, permit me to indulge in an anthropologic retroview.

If you will have an opportunity to study the skulls of our progenitors, even as late as the Cro-Magnon type, you will be impressed with the powerful structure of the canine teeth. These teeth, in a period still more remote

Fig. 10.

must have served a purpose other than grasping food. They were admirable weapons of offense and defense. The large canines of today are nothing more than an atavism, and I am certain that with the diminution of these teeth there will come a contemporaneous enlargement of the thumb. The fighter will retain them, and the pacifist will possess them in a rudimentary form.

I mentioned in a previous discussion that there were three dominant glands which guard over the destiny of man during his life. The thymus is the child's gland, the gonads of the adult, and the adrenals of old age. When the gonads assume control all of you know what happens. We shall designate this revolution as the crisis of the gonadoadvent. There is another revolution when the gonads have served their purpose and the adrenals assume the reins of government, followed by another crisis or gonadopause. Don't speak of menopause, for men go through this revolution as much as women, and some suffer considerably. The woman often takes drugs, maybe

aspirin, for her gamut of inconveniences, while the male finds solace in much smoking. To him tobacco becomes a necessity, and only a near-sighted physician will rob him of his boon. For an adrenopath (and the gonadopause makes of most of us adrenopaths) tobacco has a definite soothing effect. It relaxes his arterial tension for the time being, gives him a mental relaxation, and helps him to digest his food. You will by now be able to put two and two together and work out the modus operandi of better digestion after a smoke.

Let us argue this together. His arterial tension is relaxed. Why is it so? Simple enough. The homeopathic dose of nicotine mildly checks the adrenal output. With this diminution hydrochloric acid is increased in the gastric juice. This increase is enough to settle in your minds why his digestion is better. Do not take away tobacco from a gonadopause man. Any symptoms of a spastic nature during this crisis are ameliorated by smoking, be this a spastic constipation, or a pain in the cardiac region due to a similar spasm. The desire to smoke is nothing more than a hunger for antispasmodics, so let him have this soothing nicotine for his vasomotor apparatus.

By this time you will have designated me as an iconoclast, but I assure you my thunder is not borrowed from an inborn vivid imagination, but from examples, which are, thanks to God, still here to vouch for the benefits which they derived from conceptions such as the above.

IMPRESSIONS OF THE FIRST INTERNATIONAL ORTHODONTIC CONGRESS, NEW YORK, AUGUST, 1926*

By Doctor O. Rubbrecht, Ghent, Belgium
Professor, University of Ghent

THE First International Congress of Orthodontia was held in New York in the spacious reception rooms of the Hotel Commodore. Our American confreres did all in their power to make the Congress a complete success. The president-general of the Congress, Dr. Fisher, made a trip to Europe in 1922 and in 1924 to obtain as big and as active a participation as possible of the European Societies of Orthodontia. The idea of these organizers across the Atlantic is that this Congress should have essentially an international character, and should reflect faithfully the actual condition of orthodontia.

The Congress opened Monday, August 16, with about six hundred specialists from many countries of the old and new world gathered together. Mr. Augustus S. Downing, commissioner of the Department of Education, representing his Excellency, the Governor of New York State, made the first speech. Avoiding to take any position on the question whether the dentist should or should not be a doctor of medicine, Mr. Downing emphasized the close ties that unite the dental art with medicine. Pediatrics and orthodontics are inseparable. Orthodontia is closely united to medicine and one depends upon the other. All the efforts of the Department of Public Instruction of the state of New York tend to develop scientific and medical association of dentists and to elevate and dignify the specialty they represent. The ideas expressed by Mr. A. S. Downing were not purely of a fraternal character, but would be, in the near future, realized in practice.

Dr. Leuman M. Waugh replied to the representative of the government. We understand that seven or eight universities give sufficient instruction in orthodontia. Dr. Waugh demands obligatory studies and special studies to practice this specialty. We learned that at the Columbia University, of New York, where Dr. Waugh directs the department of orthodontia, the teaching of this branch requires six professors or instructors. Each one has the care of twenty-five patients. The teaching of technic begins in the third year. The students do not treat the patients.

In the Dental Department of Harvard University, at Boston, orthodontia is taught by eight instructors. The instruction extends over the four years of their dental studies. The students receive an excellent technic, and treat personally a number of patients according to their aptitude and their application.

The study of orthodontia given in most of the American dental schools is not considered sufficient and is only given to the students in their last year.

*Translation of Report by Dr. Rubbrecht from the *Revue Belge de Stomatologie.*

After Dr. Waugh's speech, Dr. Wm. C. Fisher addressed us amid great applause. He said "this is the twenty-fifth anniversary of the specialty of orthodontia. This event coincides with the foundation, in 1901, of a school by Edward H. Angle. Case, Jackson, and Bogue, had, it is true, before this date, limited their practice to orthodontia, but they stood alone. The pupils of the Angle school remained united and contributed much to the specialty. There are in the United States 450 specialists practicing orthodontia exclusively. In Canada there are but 22. The only way to have the specialty recognized, said Dr. Fisher, is to practice it exclusively. There is no specialty more worthy or more eminent than orthodontia. The European practitioners would obtain greater success if they practiced it exclusively. He who limits his practice will obtain greater results than he who does not, and he augments his chances of success. Dr. Fisher said that all is not perfect in America, and gives credit to the efforts of the European practitioner whether or not he devotes himself exclusively to orthodontia.

In America they have been so occupied with the questions of technic, with discussions of the number of practitioners, and the number of cases to be treated that they have almost lost sight of the work of scientific researches. Most of the men spend their time in trying to prove that the other man's work has no value. (Applause.) Such actions do more to retard than advance the specialty.

Dr. Fisher expressed the wish for a Second International Orthodontic Congress, to be held in three, or four, or five years, in some big European city. Actually the economic conditions in Europe are such that a number of our European confreres could not realize their desire to assist at this Congress. Dr. Fisher hopes that the Congress of Nations will heal this great wound. After the speech of the president-general the reading of the papers began. The committee of organization had arranged a program relative to the different branches of the specialty and attached a great importance to the collaboration of the confreres of the different countries. Each author was allowed thirty minutes to discourse upon his subject. The discussion, which was opened by a confrere who had studied the subject and digested the text, was allowed to consume but ten minutes. The speaker presented the complete study of the question. Forty minutes having been given to the examination of a question, there was no more time to prolong the discussion of that subject.

There would be no reason to give in this number a review of all the papers that were read at the Congress of New York. I acknowledge that I should be unable to do so, my notes not being sufficient to complete such a tremendous work. I shall add a few remarks which I think will be of interest.

Percy R. Howe (Boston), Influence of Foods on Malocclusion.

The last number of the *Belgium Review of Stomatology* published the translation of an article by this author which appeared in the *Dental Cosmos* for January of this year, in which was recounted the progress made in stomatology by dietetic research.

From the point of view of orthodontia, the researches of Percy Howe have given results of great interest. The writer has experimented on monkeys of about two years of age. In submitting some of these animals to a

regulated diet, he obtained irregularities in the position of certain teeth. Animals on exhibit, to which he gave a normal diet, that is, a diet of fruits, vegetables, and milk, presented a normal development.

In modifying the diet in another direction, Howe obtained an exaggerated calcification of the bony tissue.

DIAGNOSTIC

Axel F. Lundstrom (Stockholm), Relation of Certain Cases and Their Application to the Diagnostic.

Paul Simon (Berlin), The Necessity of a Gnathostatique Diagnostic in the Practice of Orthodontia.

The ideas and methods of Simon are actually known in general by the American specialists. A translation in English of Simon's book, "Grundzüge einer systematischen Diagnostik der Gebiss-Anomalien," made through the efforts of Benjamin E. Lischer, was just leaving the press at the time the Congress opened.

Lischer, who had the opening of the discussion of Simon's paper, gave it great praise. In a former meeting where the question of the orientation of the denture in relation to the skull was brought up, he compared Simon to Darwin. He said, as Darwin forced the scientific world to think as he did whether they desired to or not, just so those who are interested in orthodontia will be forced to adopt the ideas of Simon.

This enthusiasm is far from being shared by all the American specialists in orthodontia. The critics look at it from many sides. We are of the impression that many of the practitioners are showing a kindly attitude towards the ideas of Simon.

Rudolph Schwartz (Bale), The Cephalometriguls Methods in Orthodontia.

This method, following that of Simon, has certain points in common with the former, but follows another aim. It tried to determine the position of the denture in relation to the skull, to the face, and to the chin. The comparison of the results obtained permits one to study the phenomenon of the growth of the jaws. The Schwartz method permits also the study of the anthropologic problems having no relation to orthodontia. Described for the first time in 1923, it was later corrected and simplified. One finds in the *Fortschritte der Zahnheilkunde* of last August, a showing of the method as it was described at the New York Congress.

The Schwartz paper received a sympathetic reception.

TREATMENT

J. Lowe Young (New York), Evolution, Construction and Manipulation of Pin and Tube Appliance.

J. V. Mershon (Philadelphia), Lingual Arch.

Dr. Mershon insists that the ideal occlusion was for a long time considered synonymous to the normal occlusion. The normal occlusion includes the position of the teeth as they result from the harmonious action of the teeth, parts connected with the cavity of the mouth and the entire organism. Dr. Mershon gives a very light tension to the auxiliary springs of the lingual

arch and in general only modifies it every three to eight months. He frequently stops treatments for many months and does not put on retaining appliances.

A. H. Ketcham (Denver), Pathologic Absorption of the Roots.

The author has made radiographic examinations of 350 patients, 89 representing absorption of the roots. Among the cases treated by the pin and tube appliance there were 34 per cent with absorption of roots. The ribbon arch of Angle gave a proportion of 35.8 per cent. The labial arch in 194 cases gave an absorption in 9.2 per cent of the cases, and the lingual arch in 256 cases gave 2.3 per cent of absorption.

The radiographs taken before the treatment show a normal length of the roots. It is thought that this absorption takes place during treatment. Certain people are very susceptible. One must take into consideration the degree of immovableness and length of time.

The object of the Orthodontic Congress of New York was not simply to challenge an exchange of ideas in the interesting questions of the several fields of the specialty. The organizers wished to give to the members of the Congress in addition the opportunity to see performed by expert practitioners the different technical interventions that compose the completion of the appliance. A session of demonstration was instituted comprising six groups.

1. The completion of impressions and models.
2. The completion of bands by the direct method and by the indirect method.
3. The technic of the completion of the lingual arch and the labial arch.
4. The radiographic technic.
5. The photographic technic.
6. A demonstration of the methods of Dr. L. Stanton.

The technic of the completion of the bands by the indirect method was demonstrated by L. M. Waugh (New York) whose method, which is quite complicated, is described by Pullen in the last edition of the treatise of operative dentistry by C. N. Johnson. We were convinced by the demonstration that it was possible to obtain very good results by this method. Independent of the morning reserved for demonstrations of elementary technic, another morning was devoted to several demonstrations.

Fifty demonstrations (models and other objects that they desired to exhibit to the Congress) were placed on little round tables. Thus we came in direct contact with the different operators and could examine their methods closely.

While these demonstrations were going on, A. Rogers, of Boston, was giving a lecture on the need of muscular exercises in orthodontic treatment.

The instruction given by the writings and the clinics was completed by an exhibit in which was united material of great interest. One found there numerous presentations of cases with photographs, radiographs, written criticisms; ordinary cases, and exceptional cases. The different stages of the making of the appliances were illustrated by many photographs, accompanied by explanations, allowing one to study the smallest details of their construc-

tion. Americans have a fine appreciation of the value of time, and apply themselves to find for every invention, the shortest and easiest way.

The lingual arch is the rage. One could scarcely read of a case where the ribbon arch of Angle was used. The great majority of the American specialists, especially from the eastern section of the United States, no longer use the ribbon arch, except in exceptional cases. A great many Angle pupils, especially from the West, continue to follow the instruction of their teacher. After having spent much money in buying the ribbon arches and their accessories, we have also come to use them less and less, and to use, in general, the lingual arch and in some cases the old labial arch.

The results of radiographic examinations shown at this Congress by Ketcham, giving a proportion of 35.8 per cent of absorption of the roots with the use of the ribbon arch, should, outside of any mechanical or economical question, incite us to use the ribbon arch as little as possible. There were displayed among the exhibits numerous "charts" and "systems" pertaining to the business conduct of an orthodontic practice. There one learned of the methods which, in America, seemed best adapted to assure the practitioner a good return. Treatment with a forfeiture, such as is practical often in Europe, has no favor in America. The case having been examined at the first visit, a letter is sent to the parents advising them of the conditions relating to the treatment. In determining the fee a distinction is made between the period of active treatment, and the period of retention. The fee is counted at the rate of a certain sum each month or by the year. A young confrere from Boston told me that in his city a practitioner of ability charges twenty-five dollars a month for the active period, which amounts to three hundred for the first year of treatment.

In America the appreciation of the public for dental care, and in particular for orthodontic treatment, is incomparably greater than with us.

The straightening of children's teeth is considered by many people not as a luxury but as a necessity for saving the teeth and for the general health. It is part of what is considered necessary for the development of children on a par with their clothing and nourishment. Also there are orthodontists for every city of 30,000 to 40,000 inhabitants. In Pasadena, a city of 90,000 people, there are four practitioners limiting their practice to orthodontia. A specialist of this branch is established in a locality near Pasadena of only 1500 people.

There is no reason why a European orthodontist should not be as good a technician as the best of his American colleagues. Neither the cost of the instruments nor of the material should prevent his being proficient.

In regard to the public for whom he works and who should appreciate his efforts, it is not an exaggeration to say that here we are from ten to twenty years behind the American public. We actually think in Belgium that we need a population of two million people to maintain the practice of an orthodontist.

Near the scientific exhibits was placed the commercial exposition in which the American houses manufacturing articles relative to orthodontia displayed their products.

Like all Congresses, this one in New York had its banquet. It was admirably prepared and organized by a committee at the head of which was Dr. Waugh.

At an American banquet, one can distinguish two features: the banquet proper and the toasts. Since, in America, the latter feature does not impose any restrictions on the former, and clear water or Apollinaris, the only beverages served, are very favorable to a clearness of the mind, conditions are very propitious for the appreciation of the eloquence of the toasts.

Americans speak, in general, with a great facility and take a great pleasure in their discussions. There is a toastmaster who directs the speeches and whose duty is to amuse the public with his charm and humor between speeches.

At the New York banquet, Dr. Fisher was a perfect toastmaster. The order of the speeches was arranged alphabetically, which gave the first honor to the Belgium representative. The orchestra played the Brabaconne and all arose. Belgium was warmly applauded and we felt pass through the room a great wave of sympathy for our country.

The toasts continued for more than two hours. It was an occasion of real fraternalism between the representatives of all the countries.

It was past midnight when all the guests dispersed, taking with them a most delightful memory of this meeting.

The Congress of New York was wonderfully organized and was a brilliant success. It was arranged by a series of committees who made every effort during many long months to realize a great international scientific demonstration. All these efforts were coordinated by a bureau at the head of which presided the president-general, Dr. Fisher. One cannot give too much credit to the devotion and zeal with which this leader prepared, during many years, the first International Orthodontic Congress.

During the Congress he was always at his post, always attentive, always amicable, courteous to all, endowed with a wonderful gift of eloquence. A great part of the success of the Congress is due to him.

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EDITORIALS

The American Society of Orthodontists

THE annual meeting of the American Society of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, Illinois, on Monday, Tuesday, Wednesday, and Thursday, May 2, 3, 4, and 5, 1927.

These dates were selected by the officers of the American Society of Orthodontists. We believe the officers showed wisdom in beginning the meeting on Monday and discontinuing on Thursday. Several times the meeting has begun on Tuesday and continued until Friday, which made it necessary for the men to waste the remainder of the week in order to attend the four-day meeting.

We believe the dates selected will meet with favor with the majority of the members. It has become quite common for scientific meetings to devote

a part of their program to entertainment. At least one-half day is often devoted to golf which only a small percentage of the membership enjoys. The remaining members who are not old enough to play golf are forced to entertain themselves in some other way. We believe the entire time of a professional meeting should be taken up in the consideration of subjects that have some scientific value. The officers of the American Society of Orthodontists have this year devoted the entire four days to the consideration of scientific subjects, and the members who must play golf can follow that pastime on Sunday, May 1, or Friday, Saturday, and Sunday, May 6, 7, and 8, without in any way interfering with the four days of the scientific session.

The officers have secured a program which I believe is superior to any ever prepared for a meeting of the American Society of Orthodontists. This holds true both of the number of papers obtained and the wide range of subjects covered. Another change which is quite distinct is that the case reports have been given the standing of a paper. In times past, case reports were grouped together with the result that a great many members did not attend that portion of the program regardless of how valuable the case report was. Of course, we realize such members as do not wish to listen to case reports can absent themselves from the room during the time of the case report, but as a whole we believe the policy of mixing the case reports in with the papers, as has been done in the preliminary program, is an advantage.

In view of the important program which the officers have prepared and the constitutional amendments which are proposed, every member should attend the meeting the first week in May at the Edgewater Beach Hotel, Chicago.

Every member of the American Society is indebted to the President, Dr. Jos. D. Eby, and the Secretary, Dr. Chas. R. Baker, for their efforts in arranging this meeting. The Board of Censors, Dr. O. A. Oliver, Dr. H. C. Pollock and Dr. W. E. Flesher, have worked faithfully in preparing the program. Other appointed committees have responded to the work assigned them. They are all entitled to a vote of thanks from every member.

ORTHODONTIC NEWS AND NOTES

Twenty-Sixth Annual Meeting of the American Society of Orthodontists, 1927

MONDAY, TUESDAY, WEDNESDAY, AND THURSDAY, MAY 2, 3, 4, AND 5

EDGEWATER BEACH HOTEL, CHICAGO, ILL.

PROGRAM

MONDAY, MAY 2, 1927

Morning Session

8:30 A.M. Registration.

9:30 A.M. Business Session.
Report of Board of Censors by Oren A. Oliver, Chairman.
Report of Secretary-Treasurer by Charles R. Baker.

10:00 A.M. President's Address by Joseph D. Eby, New York City.

10:30 A.M. Paper:
The Past, Present, and Future of Orthodontics. By Frank M. Casto, Cleveland, Ohio.
(Discussion opened by L. M. Waugh, New York City.)

11:30 A.M. Case Report:
Treatment of Excessive Overbite in Primary Dentition. By Frank A. Delabarre, Boston, Mass.

12:00 M. Paper:
Some Questions. Are We Really Trying to Answer Them? By William W. Woodbury, Halifax, N. S.
(Discussion opened by C. C. Howard, Atlanta, Ga.)

1:00 P.M. Adjournment.

Afternoon Session

2:00 P.M. Paper:
The Value of Orthodontic Appliances to Immobolize Jaw Fractures. By M. N. Federspiel, Milwaukee, Wis.
(Discussion opened by Guy Hume, Toronto, Canada.)

3:00 P.M. Case Report:
Treatment of Two Different Types of Unilateral Distal Occlusion Cases. By John V. Mershon and John Ross, Philadelphia, Pa.

3:30 P.M. Paper:
A Further Report of an Investigation of Apical Root Resorption of Permanent Teeth. By A. H. Ketcham, Denver, Colo.
(Discussion opened by A. LeRoy Johnson, Philadelphia, Pa., and Milo Hellman, New York City.)

4:30 P.M. Case Report:
Class I Case Characterized by Greatly Displaced and Rotated Upper Incisors Due to Supernumerary Teeth at Median Suture. By Harry E. Kelsey, Baltimore, Md.

5:00 P.M. Adjournment.

TUESDAY, MAY 3, 1927

Morning Session

9:00 A.M. Business Session.
Reading of Minutes of Previous Meeting.

9:15 A.M. Paper:
Treatment of Overbites with Tongue Involvements. By Alfred P. Rogers, Boston, Mass.
(Discussion opened by Herbert A. Pullen, Buffalo, N. Y.)

10:15 A.M. Paper:
The Jaw Bone and Occlusion of the Teeth of Man. By Milo Hellman, New York City.
(Discussion opened by A. LeRoy Johnson, Philadelphia, Pa.)

11:15 A.M. Business Session.
Committee Reports.
Report on President's Address.
Nomination of Officers.

12:15 P.M. Luncheon and Round Table Discussion.
General Chairman, H. C. Pollock, St. Louis, Mo.

Table No. 1

Topic.—What is the present status of the laboratory-made orthodontic appliance? Is it doing any service for the public or is it in the aggregate a failure? After all the question, does it benefit the public? Can this question be discussed unbiased by orthodontists?
Chairman, C. R. Baker, Evanston, Ill.
Vice-Chairman, R. C. Willett, Peoria, Ill.

Table No. 2

Topic.—On account of the constantly increasing demand for orthodontic service should the general practitioner be encouraged to prepare himself to include orthodontic treatment in his practice?
Chairman, O. E. Busby, Dallas, Texas.
Vice-Chairman, P. G. Spencer, Waco, Texas.

Table No. 3

Topic.—Is the present orthodontic training in dental schools adequate? (a) Should the course of instruction be extended? (b) Is the present course of instruction comprehensive enough for the student entering general practice?
Chairman, F. M. Casto, Cleveland, Ohio.
Vice-Chairman, John V. Mershon, Philadelphia, Pa.

Table No. 4

Topic.—From clinical experience and observation viewed from an entirely practical and unbiased standpoint, is there any particularly outstanding factor which is responsible for the prevalence of malocclusion as observed in everyday practice; if so, what is the practical and popular reaction to this question?
Chairman, D. W. Flint, Pittsburgh, Pa.
Vice-Chairman, Walter Ellis, Buffalo, N. Y.

Table No. 5

Topic.—So-called rapid treatment vs. conservative treatment. What is the trend of opinion?
Chairman, J. A. Gorman, New Orleans, La.

Table No. 6

Topic.—What is the prevailing opinion about the treatment of deciduous dentures, Class I, Class II, Class III, and the expansion of the deciduous mandibular and maxillary arches?

Chairman, H. C. Hopkins, Washington, D. C.
Vice-Chairman, C. B. Mott, Asheville, N. C.

Table No. 7

Topic.—Is the matter of prophylaxis in orthodontia treatment pretty generally neglected in your observation? Should the orthodontists stress this point and discuss it more in order to deliver better service?
Chairman, H. L. Hosmer, Detroit, Mich.

Table No. 8

Topic.—The present status of jaw and arch anomalies as correlated with body growth, with special reference to endocrine influences.
Chairman, C. C. Howard, Atlanta, Ga.
Vice-Chairman, H. A. Holder, Nashville, Tenn.

Table No. 9

Topic.—Why do teeth decay under bands? What is the best method to prevent such decay? What are the advantages of direct and indirect methods of band making, etc.?
Chairman, Jos. E. Johnson, Louisville, Ky.
Vice-Chairman, Thad Morrison, Atlanta, Ga.

Table No. 10

Topic.—From an entirely practical standpoint and from observation in day to day practice, what is the present reaction to the proposition of root absorption during orthodontic treatment?
Chairman, A. H. Ketcham, Denver, Colo.
Vice-Chairman, Milo Hellman, New York City.

Table No. 11

Topic.—Discussion of patient's comfort during orthodontic treatment.
Chairman, C. A. Spahn, Newark, N. J.
Vice-Chairman, L. J. Porter, New York City.

Table No. 12

Topic.—If the practice of orthodontia is a true science, what is the most feasible plan to extend the service it has to offer to the masses in a competent manner?
Chairman, H. T. Tanzey, Kansas City, Mo.
Vice-Chairman, Wm. T. Brady, Kansas City, Mo.

Table No. 13

Topic.—What do you think is the best, most practical, most satisfactory method, from the standpoint of the patient alone, of handling cases one hundred miles or more remote from a skilled orthodontist?
Chairman, O. W. White, Detroit, Mich.
Vice-Chairman, M. T. Watson, Detroit, Mich.

Table No. 14

Topic.—Is progress in diagnosis desirable? Are intraoral occlusal diagnoses adequate and reliable? Are gnathostatic diagnostic procedures an improvement over occlusal methods?
Chairman, B. E. Lischer, St. Louis, Mo.
Vice-Chairman, A. C. Rohde, Milwaukee, Wis.

Table No. 15

Topic.—What would you like in the way of future programs for the American Society of Orthodontists?
Chairman, W. A. Murray, Evanston, Ill.

Afternoon Session

2:00 P.M. Lecture:
Classification of Impacted Third Molar and Conditions Associated with It. By George B. Winter, St. Louis, Mo.
(Discussion opened by Clarence O. Simpson, St. Louis, Mo.)

3:00 P.M. Case Report:
Reports Covering a Number of Cases Wherein the Removal of Either the Second or Third Molars Appears Necessary. By Paul G. Spencer, Waco, Texas.

3:30 P.M. Paper:
The Value of Ceramics in the Treatment of Orthodontic Cases. By C. W. Hoffer, Nashville, Tenn.
(Discussion opened by W. E. Flesher, Oklahoma City, Okla.)

4:30 P.M. Case Report:
Case Treated with Bracket Bands and Round Wire. By C. A. Hawley, Washington, D. C.

5:00 P.M. Adjournment.

6:00 P.M. Ladies' Dinner and Theater Party.
Mrs. Charles R. Baker, Hostess.

7:00 P.M. Banquet in honor of the Past Presidents of the A. S. O.
Toastmaster, Thomas P. Hinman, Atlanta, Ga.

WEDNESDAY, MAY 4, 1927

Morning Session

9:00 A.M. Business Session.
Reading of Minutes of Previous Meeting.

9:15 A.M. Paper:
Are There Certain Cases of Malocclusion Where Orthodontic Treatment is Contraindicated? By B. Frank Gray, San Francisco, Calif.
(Discussion opened by James D. McCoy, Los Angeles, Calif.)

10:15 A.M. Paper:
Some Abnormal Functions Associated with Malocclusion. By Lloyd S. Lourie, Chicago, Ill.
(Discussion opened by Alfred P. Rogers, Boston, Mass.)

11:15 A.M. Case Report:
Case Showing Progressive Changes in High Labial Arch During Treatment. By James W. Ford, Chicago, Ill.

11:30 A.M. Paper:
How Can the Orthodontist Help Preventive Dentistry? By Thaddeus P. Hyatt, New York City.
(Discussion opened by Frank A. Delabarre, Boston, Mass.)

12:30 P.M. Adjournment.

12:45 P.M. President's, President-elect's, and Past Presidents' Luncheon.

Afternoon Session

2:00 P.M. Paper:
The Possibilities of Gnathostatics in Differential Diagnosis. By A. C. Rohde, Milwaukee, Wis.
(Discussion opened by A. H. Suggett, San Francisco, Calif.)

3:00 P.M. Paper:
A Consideration of Continuous Treatment. By Arthur L. Morse, Boston, Mass.
(Discussion opened by H. K. Hatfield, Boston, Mass.)

4:00 P.M. Case Report:
Reports Showing Actual Appliances and Results Obtained in Three Mesioclusion Cases. By Oren A. Oliver, Nashville, Tenn.

4:30 P.M. Paper:
Some Phases of Treating Real Young Patients Who Have Only Deciduous Teeth. By Charles R. Baker, Evanston, Ill.
(Discussion opened by P. G. Spencer, Waco, Texas.)

5:00 P.M. Adjournment.
8:00 P.M. Clinical Rehearsal.
For Clinicians Only.

THURSDAY, MAY 5, 1927

Morning Session

9:00 A.M. Business Session.
Reading of Minutes of Previous Meeting.
9:15 A.M. Case Report:
The Treatment of a Case Requiring Diversified Tooth Movement, Using the Open Tube Appliance as a Means of Force Control. By James D. McCoy, Los Angeles, Calif.
9:45 A.M. Paper:
A Critique of Simon's Diagnostic Methods. By Frederick L. Stanton, New York City.
(Discussion opened by Milo Hellman, New York City.)
10:45 A.M. Case Report:
Bilateral Distal Occlusion, Labioversion of Maxillary Teeth. By Percy R. Ashplant, Newburgh, N. Y.
11:00 A.M. Paper:
A Radiographic Study of Facial Deformity. By Martin Dewey and Sydney Reisver, New York City.
(Discussion opened by F. M. Casto, Cleveland, Ohio.)
12:00 M. Case Report:
Results in Attempting to Meet the Problems Presented in Cases Where Some Teeth Are Absent. By A. H. Ketcham, Denver, Colo.
1:00 P.M. Adjournment.

Afternoon Session

2:00 P.M. Competitive Clinics.
The Society having the best all-round clinic will be presented with a silver cup donated by President Joseph D. Eby.

The Southwestern Society

Chairman, P. G. Spencer, Waco, Texas

No. 1. Coil Auxiliary Springs. By E. B. Arnold, Houston, Texas.
No. 2. Closing Spaces Subsequent to Extraction, Congenital Absence, or Otherwise Loss of Permanent Teeth. By H. G. Tanzey, Kansas City, Mo.
No. 3. Molar Band Construction. By O. H. McCarty, Tulsa, Okla.
No. 4. A Soldered Lingual Arch. By J. M. Jones, Wichita, Kansas.
No. 5. Valuable Points in Band Technic and Cementation as Related to Prevention of Caries. By Wm. E. Flesher, Oklahoma City, Okla.
No. 6. Removable Lingual Arch. By W. A. McCarter, Topeka, Kan.
No. 7. Restoring Functional Activity. By T. M. Robertson, Coffeyville, Kan.
No. 8. Appliance for Anterior Movement of Molars to Close Space of Missing Premolars. By W. T. Chapman, El Paso, Texas.
No. 9. Just a Clinic of no Special Value to Orthodontists. By C. W. Williams, Shreveport, La.
No. 10. Models with Lingual Appliance Showing Results in a Class II Case. By G. L. Turner, Wichita, Kan.
No. 11. Workable Bite Opener. By H. A. Potter, Kansas City, Mo.
No. 12. Third Molar Problems. By P. G. Spencer, Waco, Texas.
No. 13. Anomalies as Portrayed by Radiogram. By H. A. Allshouse, Kansas City, Mo.
No. 14. Photography. By W. B. Stevenson, Amarillo, Texas.
No. 15. Radiographic Technique. By T. G. Duckworth, San Antonio, Texas.

No. 16. Photographic History of Orthodontic Appliances. By H. B. Robison, Great Bend, Kan.

No. 17. Identical Twins. By O. E. Busby, Dallas, Texas.

The Pacific Coast Society

Chairman, Harvey A. Stryker, Los Angeles, California

No. 1. Molar Band Technic. By James D. McCoy, Los Angeles, Calif.

No. 2. Labial and Lingual Appliances. By Harvey A. Stryker, Los Angeles, Calif.

No. 3. Lingual Expansion Arch. By Walter J. Furie, Long Beach, Calif.

No. 4. Gnathostatic Models of Extreme Mandibular Protraction Plus Extreme Mandibular Incisal Attraction. Second Model Showing Same After Treatment. Third Model Same Case One Year Later. By A. H. Suggett, San Francisco, Calif.

The Rocky Mountain Society

Chairman, Wm. R. Humphrey, Denver, Colorado

No. 1. Indirect Molar Band Technique. By Archie Brusse, Denver, Colo.

No. 2. Studies in Dental Anatomy Which Relate to the Fit of the Bands. By Wm. R. Humphrey, Denver, Colo.

No. 3. X-ray Technic Demonstration with Special Attention to Angulation. By A. H. Ketcham, Denver, Colo.

The Southern Society

Chairman, Claude R. Wood, Knoxville, Tennessee

No. 1. Case Report of Open Bite. By A. S. Bumgardner, Charlotte, N. C.

No. 2. An Appliance for the Apical Movement of Incisors and Cuspids. By Winston P. Caine, Chattanooga, Tenn.

No. 3. Subject to be announced. By W. B. Childs, Macon, Ga.

No. 4. Treated Cases and Appliances Used. By Hubert T. Gosney, Danville, Va.

No. 5. An Original Method of Constructing Extraoral Anchorage. (Moving Pictures.) By C. C. Howard, Atlanta, Ga.

No. 6. Treated Cases. By C. C. Johnson, Memphis, Tenn.

No. 7. Individual Points in Appliance Technic. By Harry E. Kelsey, Baltimore, Md.

No. 8. Subject to be announced. By Barney Kennedy, Jackson, Miss.

No. 9. Treated Cases. By T. T. Moore, Columbia, S. C.

No. 10. Band Technic. By Thad Morrison, Atlanta, Ga.

No. 11. Cases Treated. By W. E. Lundy, Memphis, Tenn.

No. 12. Treated Cases. By Carlton Mott, Asheville, N. C.

No. 13. Orthodontic Eruption of Teeth. By John McPhail, Cincinnati, Ohio.

No. 14. The Treatment of Class I Cases Showing Results Obtained. By Oren A. Oliver, Nashville, Tenn.

No. 15. A New Photostatic Device. By Harle L. Parks, Atlanta, Ga.

No. 16. Suggestions for Busy Orthodontists. By F. F. Perry, Montgomery, Ala.

No. 17. Development by Pressure from Soft Tissues. By W. K. Slater, Knoxville, Tenn.

No. 18. Treated Cases with Appliances. By Claude R. Wood, Knoxville, Tenn.

The Great Lakes Society

Chairman, Harry Hosmer, Detroit, Michigan

No. 1. Retaining and Correction Appliances, Combining Cast and Wire Noble Metals, with Detailed Construction. By Varney Barnes, Cleveland, Ohio.

No. 2. A—Appliances to Close Anterior Open Bites. B—Appliance to Straighten Up Tipped Molars. C—Appliance to Rotate Molars. By J. D. Locke, Grand Rapids, Mich.

No. 3. Two Impacted Central Incisors in the Superior Maxillary Bone.

No. 4. An Efficient Cementing and Soldering Cabinet. By Bernard L. Hyams, Montreal, Quebec.

The New York Society

Chairman, Lowrie J. Porter, New York City

No. 1. Auxiliary Springs Used in Practical Cases. By P. R. Ashplant, Newburgh, N. Y.

No. 2. The Gove Arch Wire Attachment. By Fred A. Blumenthal, Boston, Mass.

No. 3. Solving the Problem of Impacted Cuspids. By Albert W. Crosby, New Haven, Conn.

No. 4. The Principles of Wire Bending. By Frank A. Delabarre, Boston, Mass.

No. 5. Combination Light Labial and High Labial Arches with Variations. By Stanley M. Dow, New York City.

No. 6. Simplified Labial Arch Technic Giving Freedom for Individual Tooth Movement. Instrument Used in Taking off and Putting on Lingual Appliances. By Walter H. Ellis, Buffalo, New York.

No. 7. Spring for the Continuous Retraction of Anterior Teeth Carrying Bracket Bands. By B. Edwin Erikson, Chevy Chase, Md.

No. 8. Joseph D. Eby, New York City.

No. 9. A Mandibular Appliance Design for Predetermining Tooth Movement, Illustrating Its Dynamic Action. By Henry C. Ferris, New York City.

No. 10. Unusual Movement of Central Toward Median Line Complicated by Supernumeraries Improved Lingual Lock and Half Labial Appliances. By W. C. Fisher, New York City.

No. 11. A Simple Method of Hardening Record Models. By Ashley E. Howes, New Rochelle, N. Y.

No. 12. Removable Anterior Section for Hawley Retainers. By Augustus B. Holt, New York City.

No. 13. Demonstrating the Practical Use of Porter Model Former. By W. A. Hillis, Greenwich, Conn.

No. 14. Applications of the Labial Auxiliary Spring. By Andrew F. Jackson, Philadelphia, Pa.

No. 15. Orthodontic Treatment with Arms, Springs, Fingers, and (with Equalizing Posts) Either Spring or Rigid, Including the Movement of the Teeth Bodily and Retaining Them. By V. H. Jackson, New York City.

No. 16. Correcting Open Bite Cases and Sliding Device for Correcting Distal Occlusions. By N. C. Leonard, Baltimore, Md.

No. 17. Lingual Spring Expansion Appliance Followed by Auxiliary Springs and Labial Appliances. By Lowrie J. Porter, New York City.

No. 18. Direct Method of Making Molar Bands. By Herbert A. Pullen, Buffalo, N. Y.

No. 19. How to Make Molar Bands Fit. By Alfred P. Rogers, Boston, Mass.

No. 20. The Treatment of Unilateral Distal Occlusion Cases. By John W. Ross, Philadelphia, Pa.

No. 21. Frederick L. Stanton, New York.

No. 22. Tissue Tension Retractor Devised for Reduction of Alveolar Process in Marked Anterior Protrusions of the Maxillae. By Irving Spenodel, New York City.

No. 23. More Control of the Unseen Forces in Appliances. By Chas. A. Spahn, Newark, N. J.

No. 24. Result of a Year's Treatment with Mershon Light Auxiliary Spring Pressure. By Raymond L. Webster, Providence, R. I.

No. 25. Labial Arch (Round Wire Section) in Bracket Bands. By L. M. Waugh, New York City.

4:15 P.M. Business.

Installation of Officers.

5:00 P.M. Adjournment.

Case Report Exhibit.

Chairman, H. C. Metz, Pittsburgh, Pa.

The Case Reports will be exhibited under glass and will be accessible to everyone during the entire meeting.

Diagnosis and Treatment of a Class I (Angle) Complicated with a Supernumerary in Upper Incisor Region. By G. M. Anderson, Baltimore, Md.

Opening Up Space for Canine Using Lingual Arch with One Finger Spring. By E. B. Arnold, Houston, Texas.

Four Deciduous Lateral Incisors on the Maxilla in Perfect Alignment and Occlusion. By E. N. Bach, Toledo, Ohio.

Impacted Cuspid. Female, 18 Years Old. By H. C. Ferris, New York City.

Showing Models and Series of Radiograms of Case Having Four Rudimentary Enamel Buds Where Permanent Laterals Should Erupt. Lateral in Malposed Position. Radiogram Showing Lateral Erupting Without Aid After Removal of Obstructions. By A. C. Gifford, Oshkosh, Wis.

Making Room or Relieving Impacted Mandibular Premolars. By F. H. Harrison, Waco, Texas.

Illustrating Use of Round Wire in Bracket Bands. By C. A. Hawley, Washington, D. C.

Method of Constructing and Applying Extraoral Anchorage. By C. C. Howard, Atlanta, Ga.

Mesioclusion. By R. E. Irish, Pittsburgh, Pa.

The Correction of Transposed Teeth with the Use of Labial Auxiliary Springs. By A. F. Jackson, Philadelphia, Pa.

Models and Appliances—Showing Cases Treated by the Jackson Plan. By V. H. Jackson, New York City.

Results in Attempting to Meet the Problems Presented in Cases Where Some Teeth Are Absent. By A. H. Ketcham, and W. R. Humphrey, Denver, Colo.

Lingual Arch Appliance Supplying Missing Teeth During Treatment. Patient Aged Twenty-five. By H. C. Metz, Pittsburgh, Pa.

Models and Appliances Showing Growth Obtained in Ninety Days by Gentle Stimulation with One Adjustment. By F. F. Perry, Montgomery, Ala.

Lingual and Labial Appliances. By C. A. Spahn, Newark, N. J.

Lingual Appliance. By P. G. Spencer, Waco, Texas.

Treatment of a Case with Missing Maxillary Lateral Incisors. By H. A. Stryker, Los Angeles, Calif.

Treatment of Class II Case at Two Years of Age. By A. G. Wick, Pittsburgh, Pa.

A Neutroclusion Case. One Year's Work with Lingual Appliances Using Finger Springs. By W. G. Hughes, Walla Walla, Wash.

Four Cases Illustrating Bone Development Independent of Teeth. By Varney Barnes, Cleveland, Ohio.

Jaw Reconstruction Following Bilateral Compound Fracture Cast. Space Maintainers and Cast Restorations for Deciduous Molars. By R. C. Willett, Peoria, Ill.

Office Records Exhibit.

Chairman, E. N. Bach, Toledo, Ohio.

Exhibits of Office Records are to be arranged so as to be accessible to everyone during the entire meeting. These records are provided by members who use

them daily in their practice. They will include History, Examination, Treatment, Index, Financial Expenses, etc., everything except Photographic and Radiographic records. This is a wonderful exhibit of records which you cannot afford to overlook.

Office Records. By Burt Abell, Toledo, Ohio.

Office Records. By C. A. Adelstein, Cleveland, Ohio.

Use of Dictaphone in Connection with Office Records. By E. M. Bach, Toledo, Ohio.

Office Records. By O. W. Brandhorst, St. Louis, Mo.

Office Records. By C. S. Conover, New York City.

Office Records. By A. W. Crosby, New Haven, Conn.

Office Records. By F. A. Delabarre, Boston, Mass.

Pamphlet Form "Instructions for Care of the Mouth." By R. E. Irish, Pittsburgh, Pa.

Office Records. By S. J. Lewis, Detroit, Mich.

Office Records. By J. D. Locke, Grand Rapids, Mich.

Office Records and Form Letters. By James D. and John R. McCoy, Los Angeles, Calif.

Office Records. By H. C. Pollock, St. Louis, Mo.

Office Records of All Departments Using Kardex System. By H. A. Pullen, Buffalo, N. Y.

Enlarged Photographic Reproductions of Orthodontic Records. By C. A. Spahn, Newark, N. J.

Office Records. By D. S. Sterrett, Erie, Pa.

Office Records. By W. S. Watson, New York City.

The Adaption of Rand Kardex System to Orthodontia. By O. W. White, Detroit, Mich.

Forms for Business Administration. By H. C. Willett, Peoria, Ill.

Office Records. By H. B. Robinson, Great Bend, Kansas.

Photographic and Radiographic Exhibit.

Chairman, O. W. Brandhorst, St. Louis, Mo.

The Photographic and Radiographic Exhibit will be accessible to everyone during the entire meeting.

Photographic Exhibit. By A. B. Brusse, Denver, Colo.

Photographic Exhibit Showing Correction of Jaw Deformities Not Amenable to Orthodontic Treatment Alone. By Vilray Papin Blair, M.D., St. Louis, Mo.

Photostatic Photography. Method and Equipment Used for: (a) Facial Photography. (b) Cast Photography. (c) Skull Photography. By O. W. Brandhorst, St. Louis, Mo.

Endocrinology and Its Relation to Orthodontia. Shown with Photographs and X-rays of a Few of the More Common Signs and Symptoms of Endocrine Derangement that Might Help the Orthodontist in His Diagnosis. Also a Few Simple Methods Used in the Engelbach Clinic in Photographing and Radiographing Individuals to Facilitate Classification. By Wm. Engelbach, A.B., M.D., F.A.C.P., St. Louis, Mo., and Thos. E. Prosser, D.D.S., East St. Louis, Ill.

Posing Patient for Profile Photograph and Trimming Print. By G. W. Grieve, Toronto, Canada.

Standardized Photostatic Technic. By Norman L. Hillyer, Brooklyn, N. Y.

Photographic Exhibit. By C. A. Hawley, Washington, D. C.

Photographic Exhibit. By Henry F. Hoffman, Denver, Colo.

Photographic Exhibit. By C. W. Koch, Little Rock, Ark.

Some New Thoughts on Photographic Work. By Harle L. Parks, Atlanta, Ga.

Photographs as an Aid to Diagnosis. By Homer A. Potter, Kansas City, Mo.

Photographic Exhibit Showing Changes Brought About by Physiologic Functioning. By Homer B. Robinson, Great Bend, Kan.

Economic and Efficient Orthodontic Photography. By C. A. Spahn, Newark, N. J.

Photographing Plaster Casts for Orthodontic Case Records. By R. C. Willett, Peoria, Ill.

Talk It Over with Your Photographer. By W. W. Woodbury, Halifax, N. S.

Radiographic Exhibit. By A. B. Brusse, Denver, Colo.

Radiographic Exhibit. This Exhibit Will Show Work Done in Research. By the Dewey School of Orthodontia.

Standardized Radiographic Technic. By Normal L. Hillyer, Brooklyn, N. Y.

Radiographic Exhibit. By Henry F. Hoffman, Denver, Colo.

The Use of the Stereoroentgenogram in Orthodontic Cases Showing Irregular Eruption of Teeth. By C. A. Lemaster, St. Louis, Mo.

Radiographic Exhibit Showing Normal and Abnormal Tongue Position. By L. S. Lourie, Chicago, Ill.

Radiographic Examination for Orthodontic Treatment. By L. R. Main, St. Louis, Mo.

Radiographic Exhibit. By W. A. Murray, Evanston, Ill.

Radiographic Surveys for Orthodontic Purposes. By James D. McCoy, Los Angeles, Calif.

Radiographic Exhibit Showing Cystic Condition Relieved by Orthodontic Treatment. By Harle L. Parks, Atlanta, Ga.

Educational X-ray Reference. By D. S. Sterrett, Erie, Pa.

Radiographic Exhibit. Showing (a) Case with Upper Centrals and Lower Centrals, Laterals and Cuspids Absent. (b) Case with Four Maxillary Molars on Each Side. By Allen H. Suggett, San Francisco, Calif.

Routine Radiographic Examination for Orthodontic Treatment. By C. O. Simpson, St. Louis, Mo.

Radiographic Positions for Standard Routine Orthodontic Examination of Teeth and Jaws. By L. M. Waugh, New York City.

Radiographic Exhibit Showing Various Positions of Mandibular Third Molars and Conditions Associated Therewith. By George B. Winter, St. Louis, Mo.

Photographic Exhibit Showing Retarded Maxilla with Open Bite. By W. A. McCarter, Topeka, Kansas.

Photographic Exhibit. By M. J. Buckley, Chicago, Ill.

Radiographic Exhibit. By M. J. Buckley, Chicago, Ill.

Cast Photography. By Thos. M. Robertson, Coffeyville, Kansas.

American Society of Orthodontists Round Table Discussion

The organization of the round table luncheon in Chicago, May 4, has been partially completed up to this time. Reports that have been turned in so far to the General Chairman are listed below. All members of the American Society of Orthodontists who desire to participate in the round table discussion in Chicago and who have not previously been identified with any particular subject or table will please communicate with Dr. William A. Murray, 636 Church Street, Evanston, Illinois. Dr. Murray is in charge of Table No. 15, the subject of which is "What would you like in the way of future programs for the American Society of Orthodontists?" It is desired that this table be large in numbers in order that the above question may be freely discussed and sentiment correlated and crystallized on this subject. Any member of the American Society of Orthodontists who desires to join this table will please advise Dr. Murray accordingly. No formalities will be necessary other than to advise him you expect to be present at his table on the day of the Round Table. Reservations must be made for each and every table, therefore, members will kindly cooperate and identify themselves with group tables previous to the meeting. If you desire to join any particular group or table listed in these pages, please communicate directly with the Chairman of the Round Table with which you desire to be identified.—General Chairman, Dr. H. C. Pollock, 4482 Washington Avenue, St. Louis, Missouri.

Table No. 1.

Topic.—"What is the present status of the laboratory-made orthodontic appliance? Is it doing any service for the public or is it in the aggregate a failure? After all the question, does it benefit the public? Can this question be discussed unbiased by orthodontists?"

Chairman, Dr. C. R. Baker, Evanston, Ill.
Vice-Chairman, Dr. R. C. Willett, Peoria, Ill.

Members of this group up to time of going to press:

Dr. F. R. Blumenthal, Boston, Mass.
Dr. S. W. Bradley, Ottawa, Ont., Canada.
Dr. J. D. McCoy, Los Angeles, Calif.
Dr. H. F. Hoffman, Denver, Colo.
Dr. F. C. Rogers, St. Louis, Mo.

Table No. 2.

Topic.—"On account of the constantly increasing demand for orthodontic service should the general practitioner be encouraged to prepare himself to include orthodontic treatment in his practice?"

Chairman, Dr. Oscar E. Busby, Dallas, Tex.
Vice-Chairman, Dr. P. G. Spencer, Waco, Tex.

Members of this group up to time of going to press:

Dr. E. E. Richardson, San Francisco, Calif.
Dr. John W. Ross, Philadelphia, Pa.
Dr. Wm. E. Flesher, Oklahoma City, Okla.
Dr. N. H. Coleman, Wichita Falls, Tex.
Dr. B. J. MacGinnis, Beaumont, Tex.
Dr. A. B. Conly, Dallas, Tex.
Dr. Martin Dewey, New York, N. Y.
Dr. Frank F. Perry, Montgomery, Ala.

Table No. 3.

Topic.—"Is the present orthodontic training in dental schools adequate?

(a) Should the course of instruction be extended?
(b) Is the present course of instruction comprehensive enough for the student entering general practice?"

Chairman, Dr. Frank M. Casto, Cleveland, Ohio.
Vice-Chairman, Dr. John V. Mershon, Philadelphia, Pa.

Members of this group up to time of going to press:

Dr. L. W. Baker, Boston, Mass.
Dr. E. G. Jones, Columbus, Ohio.
Dr. LeRoy Johnson, Philadelphia, Pa.
Dr. T. L. Grisamore, Chicago, Ill.
Dr. A. J. Hall, Ann Arbor, Mich.
Dr. M. E. Ernst, St. Paul, Minn.
Dr. H. A. Pullen, Buffalo, N. Y.
Dr. W. W. Woodbury, Halifax, Nova Scotia.

Table No. 4.

Topic.—"From clinical experience and observation viewed from an entirely practical and unbiased standpoint, is there any particular outstanding factor which is responsible for the prevalence of malocclusion as observed in everyday practice; if so, what is the practical and popular reaction to this question?"

Chairman, Dr. D. Willard Flint, Pittsburgh, Pa.
Vice-Chairman, Walter Ellis, Buffalo, N. Y.

Members of this group up to time of going to press:

Dr. J. A. Burril, Chicago, Ill.
Dr. Joseph Eby, New York City, N. Y.
Dr. O. A. Oliver, Nashville, Tenn.
Dr. Ernest Bach, Toledo, Ohio.
Dr. George W. Grieve, Toronto, Canada.
Dr. H. E. Kelsey, Baltimore, Md.

Table No. 5.

Topic.—"So-called rapid treatment vs. slow and conservative treatment. What is the trend of opinion?"

Chairman, Dr. J. A. Gorman, New Orleans, La.

Table No. 6.

Topic.—"What is the prevailing opinion about the treatment of deciduous dentures, Class I, Class II, Class III, and the expansion of the deciduous mandibular and maxillary arches?"

Chairman, Dr. Herbert C. Hopkins, Washington, D. C.
Vice-Chairman, Dr. Carlton B. Mott, Asheville, N. C.

Table No. 7.

Topic.—"Is the matter of prophylaxis in orthodontic treatment pretty generally neglected in your observation? Should the orthodontists stress this point and discuss it more in order to deliver better service?"

Chairman, Dr. Harry L. Hosmer, Detroit, Mich.

Table No. 8.

Topic.—"The present status of jaw and arch anomalies as correlated with body growth, with special reference to endocrine influences."

Chairman, Dr. Clinton C. Howard, Atlanta, Ga.
Vice-Chairman, Dr. Harry Holder, Nashville, Tenn.

Members of this group up to time of going to press:

Dr. Leo. M. Shanley, St. Louis, Mo.
Dr. F. H. Sturdevant, Orlando, Fla.
Dr. A. H. Suggett, San Francisco, Calif.
Dr. B. Frank Gray, San Francisco, Calif.
Dr. John A. McPhail, Cincinnati, Ohio.
Dr. Archie B. Brusse, Denver, Colo.
Dr. Albert W. Crosby, New Haven, Conn.
Dr. Oscar Carrabine, New York, N. Y.
Dr. Ira B. Stilson, Providence, R. I.
Dr. George Crozat, New Orleans, La.
Dr. P. R. Ashplant, Newburgh, N. Y.

Table No. 9.

Topic.—"Why do teeth decay under bands? What is the best method to prevent such decay? What are the advantages of direct and indirect methods of band making, etc.?"

Chairman, Dr. Joseph E. Johnson, Louisville, Ky.
Vice-Chairman, Dr. Thad Morrison, Atlanta, Ga.

Members of this group up to time of going to press:

Dr. George M. Anderson, Baltimore, Md.
Dr. V. E. Barnes, Cleveland, Ohio.
Dr. I. W. Bull, Jacksonville, Fla.
Dr. Adelbert Fernald, Boston, Mass.
Dr. F. A. Flett, Detroit, Mich.
Dr. A. C. G. Gifford, Oshkosh, Wis.

Dr. C. C. Johnson, Memphis, Tenn.
Dr. Thomas T. Moore, Columbia, S. C.
Dr. Norborne F. Muir, Roanoke, Va.
Dr. W. S. Sargeant, Toledo, Ohio.
Dr. D. S. Sterrett, Erie, Pa.
Dr. R. L. Webster, Providence, R. I.

Table No. 10.

Topic.—"From an entirely practical standpoint and from observation in day to day practice, what is the present reaction to the proposition of root absorption during orthodontic treatment?"

Chairman, Dr. A. H. Ketcham, Denver, Colo.
Vice-Chairman, Dr. Milo Hellman, 40 E. 41st St., New York City.

Members of this group up to time of going to press:

Dr. Harry A. Allshouse, Jr., Kansas City, Mo.
Dr. Wm. T. Chapman, El Paso, Tex.
Dr. Robert W. Gaston, New Orleans, La.
Dr. Louis M. James, Kansas City, Mo.
Dr. Chas. C. A. Mann, Seattle, Wash.
Dr. H. L. Morehouse, Spokane, Wash.
Dr. Wm. B. Stevenson, Amarillo, Tex.
Dr. Hugh Tarpley, Quincy, Ill.
Dr. Albert E. Voss, Los Angeles, Calif.
Dr. Homer B. Robison, Great Bend, Kans.
Dr. T. G. Duckworth, San Antonio, Tex.
Dr. Hugh K. Hatfield, Boston, Mass.
Dr. Frederick B. Noyes, Chicago, Ill.
Dr. A. C. Gifford, Oshkosh, Wis.

Table No. 11.

Topic.—"Discussion of patient's comfort during orthodontic treatment."

Chairman, Dr. Charles A. Spahn, Newark, N. J.
Vice-Chairman, Dr. Lowrie J. Porter, New York, N. Y.

Members of this group up to time of going to press:

Dr. Andrew F. Jackson, Philadelphia, Pa.
Dr. Leuman M. Waugh, New York, N. Y.
Dr. Frank Clawson, Plainfield, N. J.
Dr. Chauncey Egel, Westfield, N. J.
Dr. J. D. Locke, Grand Rapids, Mich.
Dr. W. A. Hillis, Greenwich, Conn.
Dr. N. C. Leonard, Baltimore, Md.

Table No. 12.

Topic.—"If the practice of orthodontia is a true science, what is the most feasible plan to extend the service it has to offer to the masses in a competent manner?"

Chairman, Dr. Hugh G. Tanzey, Kansas City, Mo.
Vice-Chairman, Dr. Wm. J. Brady, Kansas City, Mo.

Members of this group up to time of going to press:

Dr. C. M. McCauley, Los Angeles, Calif.
Dr. B. G. DeVries, Minneapolis, Minn.
Dr. Abram Hoffman, Buffalo, N. Y.
Dr. Frank A. Delabarre, Boston, Mass.
Dr. T. O. Gorman, San Antonio, Tex.
Dr. Wm. Humphrey, Denver, Colo.
Dr. J. W. Ford, Chicago, Ill.
Dr. Lloyd S. Lourie, Chicago, Ill.

Table No. 13.

Topic.—"What do you think is the best, most practical and most satisfactory method, from the standpoint of the patient alone, of handling cases one hundred miles or more remote from a skilled orthodontist?"

Chairman, Dr. Oliver W. White, Detroit, Mich.
Vice-Chairman, Dr. Milton T. Watson, Detroit, Mich.

Members of this group up to time of going to press:

Dr. Samuel Lewis, Detroit, Mich.
Dr. Burt Abell, Toledo, Ohio.
Dr. E. Santley Butler, New York, N. Y.
Dr. Henry C. Ferris, New York, N. Y.

Table No. 14.

Topic.—"Is progress in diagnosis desirable? Are intraoral occlusal diagnoses adequate and reliable? Are gnathostatic diagnostic procedures an improvement over occlusal methods?"

Chairman, Dr. B. E. Lischer, St. Louis, Mo.
Vice-Chairman, Dr. A. C. Rohde, Milwaukee, Wis.

Members of this group up to time of going to press:

Dr. O. W. Brandhorst, St. Louis, Mo.
Dr. M. N. Federspiel, Milwaukee, Wis.
Dr. C. A. Hawley, Washington, D. C.
Dr. Norman Hillyer, Brooklyn, N. Y.
Dr. F. W. Nash, Washington, D. C.
Dr. F. T. Murlless, Hartford, Conn.
Dr. Allen Scott, San Francisco, Calif.
Dr. Ralph Waldron, Newark, N. J.

Table No. 15.

Topic.—"What would you like in the way of future programs for the American Society of Orthodontists?"

Chairman, Dr. William A. Murray, Evanston, Ill.

Table No. 16.

Topic.—"What can the American Society of Orthodontists do to determine the most common preventable causes of malocclusion and attempt to bring about its ultimate eradication?"

Chairman, Dr. Landis H. Wirt, Coral Gables, Fla.
Vice-Chairman, Dr. Harvey Bean, Toronto, Canada.

Members of this group up to time of going to press:

Dr. John E. Taylor, Hollywood, Calif.

The following printed form will be distributed previous to the meeting to the various chairmen of round tables for their respective reports. This report subsequent to the round table should be handed to the general chairman for formal disposition and subsequent publication.

Report of Round Table Discussion Meeting of the American Society of Orthodontists, Chicago, Edgewater Beach Hotel, May 4, 1927

Table No. _____
Chairman _____
Vice-Chairman _____
Topic _____
Members _____
_____
_____
_____

The membership of this group discussing the above topic informally are agreed that the preponderance of opinion on the above subject at this time is as follows:

Opinion widely varied on the following points appertaining to this subject:

Conclusions:

Signed_____

Chairman.

The American Society of Orthodontists' Banquet

Those entrusted with the arrangements for the banquet which will be given to the Past-Presidents have been laying rather elaborate plans, but they have carefully concealed the details because of the desire that the token and souvenir which are to be presented to the Presidents shall come in the nature of a surprise. We are permitted by the Committee though at this time to announce some of the details which will not in any manner defeat their aforementioned purpose.

First, the Board of Censors have been able to secure one of the most able men in the dental profession to act as a toastmaster. To acquaint you with the fact that Dr. Thomas P. Hinman is the gentleman selected for this important post, is to immediately assure you of a most orderly and yet successful banquet from the standpoint of entertainment. The majority of the members probably are well acquainted with Dr. Hinman and his talents in all lines pertaining to the management of meetings. It is but to recall one of the mid-winter clinics at Atlanta to realize the talent of this gentleman. To those who have not had the pleasure of attending a banquet or a meeting in which Dr. Hinman has had any influence we can assure them of a most pleasant treat.

Each Past-President has been assigned a sponsor who will in appropriate manner and at the specified time present the Past-President token. The list of Past-Presidents and their sponsors is as follows:

Past-Presidents		*Sponsors*
1901-02	Edward H. Angle	Thomas P. Hinman
1903-12	Milton T. Watson	Thomas P. Hinman
1904-05	Lloyd S. Lourie	Charles R. Baker
1906	R. Ottolengui	Geo. W. Grieve
1907	Herbert A. Pullen	Walter H. Ellis
1908	Chas. A. Hawley	F. T. Murlless, Jr.
1909	Frank M. Casto	Oren A. Oliver
1910	B. Frank Gray	James D. McCoy
1911	Alfred P. Rogers	Frank A. Delabarre
1913	B. E. Lischer	Allen H. Suggett
1914	Guy G. Hume	Sydney W. Bradley
1915-16	F. C. Kemple	E. Santley Butler
1917	M. N. Federspiel	Arthur C. Rohde
1918	D. Willard Flint	Wilson R. Flint
1919	Oliver W. White	Harry L. Hosmer
1920	John V. Mershon	A. LeRoy Johnson
1921	J. Lowe Young	Leuman M. Waugh
1922	Martin Dewey	Oscar E. Busby

1923	Burt Abell	Henry C. Ferris
1924	Ralph Waldron	Harry E. Kelsey
1925	Clinton C. Howard	H. C. Pollock
1926	William C. Fisher	Jos. D. Eby

We will urge every member of the American Society of Orthodontists to get in touch with the Banquet Committee the very first day and in fact at the opening session and secure their place at this banquet. As has been previously announced the ladies on the evening of the banquet will be the guests of Mrs. Charles R. Baker of Evanston who has arranged an attractive dinner and theatre party for them.

St. Louis College of Dentistry, Marion-Sims Dental College, St. Louis University Dental School Graduates Homecoming, St. Louis, Mo.

On May 24, 1927, during the week of the Missouri State Dental Meeting in St. Louis, a general homecoming is being arranged at the St. Louis University Dental School, Grand and Caroline Avenues, for all the graduates of the above consolidated colleges. Among other things will be a banquet to be given by the Dental School to the Alumni. It is expected that hundreds of old "Dents" will take advantage of this opportunity to visit the old school and renew old associations.

Iowa State Dental Society

The Iowa State Dental Society will hold its sixty-fifth anniversary meeting May 3, 4 and 5, 1927, in Hotel Savery, Des Moines. The meeting is to be a homecoming, and the program will be given by Iowa and former Iowa dentists. A cordial invitation is extended to all A.D.A. members, and all former Iowa members are urged to be present. Dr. John Scholten, Secretary, Cedar Rapids, Iowa.

European Orthodontological Society

The next Annual Meeting of the European Orthodontological Society will take place on Thursday and Friday, July 21 and 22, 1927, in London at the Langham Hotel, Portland Place. A cordial invitation is extended to members of the profession who are interested in the study and practice of orthodontia, who may not be members of the Society, to attend the meeting. For further particulars kindly apply to the Hon. Sec., A. C. Lockett, Hereford House, 117 Park Street, London, W. 1, England.

The American Society of Oral Surgeons and Exodontists

American Society of Oral Surgeons and Exodontists will meet at the Statler Hotel, Detroit, Mich., October 21 and 22, 1927.

Notes of Interest

Dr. Leo M. Shanley announces the opening of offices at 4482 Washington Avenue, St. Louis, Mo. Practice limited to orthodontia.

Drs. Ketcham and Humphrey announce the removal of their offices to Suite 1232 Republic Building, 16th and Tremont Streets, Denver, Colo. Practice limited to orthodontia.

Dr. P. R. Ashplant announces the removal of his office from Nine James Street to the Gunther Building, Fifty-nine North Street, Middletown, New York. Practice limited to orthodontia.

Dr. Edwin Kanter announces the opening of his office at 22 West 74th Street, New York City. Practice limited to orthodontia.

Dr. Helen Stahle announces her association with Dr. Earl Robert Andrews in the practice of orthodontia at 6381 Hollywood Blvd., Hollywood, Calif.

DIRECTORY OF ORTHODONTIC SOCIETIES

The Eastern Association of Graduates of the Angle School of Orthodontia

Officers:

President, Dr. J. Lowe Young, New York City
Vice-President, Dr. George W. Grieve, Toronto, Canada
Secretary, Dr. E. Santley Butler, New York City
Treasurer, Dr. Walter S. Watson, New York City

Executive Committee:

Dr. Milo Hellman, Chairman
Dr. Herbert A. Pullen
Dr. Hugh K. Hatfield

Regular Meetings:

Saturday, January 29th, at Buffalo, N. Y.
Saturday, March 28th, at Boston, Mass.

Annual Meeting:

Monday and Tuesday, May 9th and 10th, at the Hotel Vanderbilt, New York City

Southern Society of Orthodontists

Officers:

President, Dr. Harry E. Kelsey, Baltimore, Md.
President-Elect, Dr. W. B. Childs, Macon, Ga.
Secretary and Treasurer, Dr. Oren A. Oliver, Nashville, Tenn.

Meetings:

Meetings are held annually. The 1928 meeting will be held at Baltimore, Md.

New York Society of Orthodontists

Officers:

President, Dr. Leuman M. Waugh, New York City.
President-Elect, Dr. Frank Delabarre, Boston, Mass.
Secretary and Treasurer, Dr. William C. Fisher, New York City.
Board of Censors: Dr. Henry C. Ferris, Dr. Joseph D. Eby, Dr. John V. Mershon.

The Great Lakes Association of Orthodontists

Officers:

President, Dr. Walter S. Sargeant, Toledo, Ohio
President-Elect, Dr. Earl H. Teetzel, Detroit, Mich.
Secretary-Treas., Dr. Ernest N. Bach, Toledo, Ohio

Board of Censors:

Dr. Harry L. Hosmer, Detroit, Mich.
Dr. James D. Locke, Grand Rapids, Mich.
Dr. Frank R. Woods, Detroit, Mich.

Meetings:

Regular meetings are the first Wednesday of November and the first Wednesday of February. The next regular meeting will be held at the Book-Cadillac Hotel, Detroit, Wednesday, February 2, 1927.

The American Society of Orthodontists

Officers:

President, Dr. Joseph D. Eby, New York City
President-Elect, Dr. Walter H. Ellis, Buffalo, N. Y.
Secretary-Treas., Dr. Charles R. Baker, Evanston, Ill.
Librarian, Dr. Abram Hoffman, Buffalo, N. Y.

Board of Censors:

Dr. Oren A. Oliver, Nashville, Tenn.
Dr. H. C. Pollock, St. Louis, Mo.
Dr. William E. Flesher, Oklahoma City, Okla.

Meetings:

Monday, Tuesday, Wednesday, and Thursday, May 2, 3, 4, 5, 1927, at Edgewater Beach Hotel, Chicago, Ill.

The Southwestern Society of Orthodontists

Officers:

President, Dr. W. T. Chapman, El Paso, Texas
President-Elect, Dr. O. H. McCarty, Tulsa, Okla.
Secretary-Treas., Dr. P. G. Spencer, Waco, Texas

Meetings:

November 2, 3, and 4, 1927, at El Paso, Texas.

European Orthodontological Society

Officers:

President, Mr. George Northcroft, London, England.
Vice-President, Dr. Hans Hecht, Berlin, Germany.
Secretary, Mr. A. C. Lockett, London, England.
Treasurer, Dr. E. F. Day, London, England.

Meetings:

July 21, 22 and 23, 1927, London, England.

The Pacific Coast Society of Orthodontists

Officers:

President, Dr. W. R. Dinham, Portland, Oregon.
Vice-President, Dr. E. C. Read, Long Beach, Calif.
Secretary, Dr. F. A. Leslie, Oakland, Calif.
Dr. James D. McCoy (Southern California), Los Angeles, Calif.
Dr. Robert Dunn (Northern California), San Francisco, Calif.
Dr. H. L. Morehouse (Washington-Oregon), Spokane, Wash.

Officers of Sections:

Southern California Section:
Chairman, Dr. Harvey A. Stryker
Secretary, Dr. Alfred Higson

Northern California Section:
Chairman, Dr. Thomas Sweet
Secretary, Dr. Howard Dunn

Washington-Oregon Section:
President, Dr. C. C. Mann
Vice-President, Dr. M. H. Fisher
Secretary, Dr. Geo. A. Baker

Meetings:

Southern California Section, second Friday of March, June, September, and December, 1927.

Northern California Section, second Tuesday of March, June, September, and December, 1927.

Washington-Oregon Section, July 18, 19 and 20, and November 7, 1927.
Next annual meeting will be held February, 1928.